MEMORANDUM

SUBJECT: EPA Comments on "Assessment of Dam Safety of Coal Combustion Surface Impoundments: Gulf Power Plant Scholz, Columbia, Sneads,Florida"

DATE: June 6, 2013

Analyses available include:

- Upper Ash Pond – Static/Seismic Analysis (One loading condition yields insufficient FOS), H/H for 100 year, 24 hour storm (No 50% PMP), Liquefaction analysis (Multiple insufficient FOS')
- Middle Ash Pond – H/H for 100 year, 24 hour storm (No 50% PMP)
- Lower Ash Pond – H/H for 100 year, 24 hour storm (No 50% PMP)

Analysis lacking:

- Upper Ash Pond – H/H for PMP
- Middle Ash Pond – H/H for PMP, Static/Seismic, Liquefaction
- Lower Ash Pond - H/H for PMP, Static/Seismic, Liquefaction

Updated ratings, pending CDM's concurrence:

- Upper Ash Pond – POOR
- Middle Ash Pond – POOR
- Lower Ash Pond – POOR
- Ash Pond (if treated as one unit) – POOR

An outstanding issue with the report is that it is not clear that the Upper, Middle, and Lower ash ponds are treated as one unit or not and the basis for this. It is in my comments.

Additionally, an ash pond maintenance plan was included in the submitted CD's

1. Please ensure that "Draft" Report is clearly marked on the cover page, the water mark is insufficient to show that this is a draft document.
2. In section 1.1 "Introduction," the second paragraph contains a grammatical error that requires revision in the discussion of the assessment of a rating of POOR; it needs at least a conjunction or to be split into two sentences. Perhaps: "In summary, the Gulf Power Company Plant Scholz ash impoundment embankments are classified as **POOR** for continued safe and reliable operation. Static and seismic engineering studies, following the best professional engineering practice to support acceptable safety factors, have not been presented for all the embankments."
3. In Section 1.1 "Introduction," the report details that the units would be considered FAIR with "minor remedial actions and provision of analysis." However, later in the report, in Section 1.3.1.1 "Conclusions…," the report notes that recent slope stability analysis yielded

insufficient factors of safety in a rapid drawdown condition. It may be advisable to remove the "Fair if…" statement.

4. On page 1-1, Section 1.2, second paragraph, please replace "Site visits were" with "A site visit was."
5. The font on page 1-1, Section 1.3.1.6 is different from that of the other subsections of 1.3.1. Please correct. Also, same comment for section 1.4.1.
6. On page 1-1, Section 1.3.1.6, first paragraph, second sentence, please include "within the property" as well as outside the property in this discussion.
7. Section 1.3.2 and subsections, please be clear and specific as to each impoundment under this recommendations section for each of the five impoundments assessed.
8. In section 1.3.2 "Recommendations," it does not appear that there are any recommendations made by CDM regarding insufficient factors of safety in the rapid drawdown condition noted in Section 1.3.1.1. Please add a recommendation to address this deficiency.
9. Section 1.4.2, although Gulf Power may refer to the management units collectively as the "ash pond," five distinct units were assessed. The report should be clear, throughout, as to which distinct units are being referred.
10. On page 2-1, Section 2.1 "Location and general Description," it may be advantageous to add the approximate latitude and longitude of the plant or the CCR impoundments for ease of reference.
11. In section 2.2 "Coal Combustion…" it is advisable to address the lack or presence of the generation of flue gas desulphurization gypsum and boiler slag.
12. In section 2.3 "Size and Hazard Classification," it may be advantageous to distinguish the size of the units as separate and distinct. It appears throughout the report to this point that CDM is considering the facility to have 5 separate units, not one "Ash Pond." The report should address why the unit is to be treated as one if so, e.g., hydraulically connected.
13. In Section 2.6 "Critical Infrastructure…" it is unclear what "Greater Mt Sinai" is referring to. Hospital?
14. Section 4.1.1, please provide at least an approximate year of construction of each of the CCR impoundments.
15. Section 5.5.4 should be addressing the outlet structures for the Middle Pond, but actually addresses the outlet structure for the Upper West Pond instead. Please correct.
16. In section 6 "Hydrologic/Hydraulic Safety," it may be advantageous to address any contributory area to the ash ponds, which appears to be sizeable from the list of associated waste streams managed by the ash ponds listed in Section 4.2.1, e.g., coal pile runoff, ward sump runoff, treated domestic water, stormwater.
17. In Section 7.1.4 "Factors of Safety…" it is apparent that there exist deficient factors of safety for the upstream slope in a rapid drawdown loading condition for the North Dike of Ash Pond Cell 1. The section does not address if sufficient analysis has proven any remedial actions to have been effective in increasing the factors of safety in rapid drawdown condition. The report should reflect the latest case, whereas it currently reads as though the insufficient factors of safety are no longer an issue, due to "flattening using ash material."
18. On page 7-3, Section 7.1.5, the contractor should give some kind of qualitative assessment based on soil analyses as to whether or not any of these units are susceptible to liquefaction. If there is reason to believe that the soil materials under each unit is not susceptible to liquefaction then there would be no need for the analyses to be performed (Section 7.2 and 7.3).

19. Section 7.1.4 and Section 7.3, have the necessary modifications already been implemented to meet the "Modified Factor of Safety" identified in Table 8 of Section 7.1.4? If so, please indicate when these modifications were implemented. If not, an improved rating should also be conditional on the implementation of these modifications.
20. Section 7.3, first bullet, first sentence: each impoundment needs to be assessed individually. How much of the stability analyses that are adequate and meet minimum factors of safety are applicable to the individual impoundments versus the "ash pond" as a whole? Please clarify. This impacts the rating of the individual units.
21. In Section 7.3, "Assessment…" the report should address the deficient factors of safety analyzed and previously mentioned due to rapid drawdown conditions.
22. On page 7-4, Section 7.3, the last four sentences in the last paragraph appear to be merely a definition of the general rationale for a rating condition of "Poor," Do the last three sentences apply specifically to these units? If so, please provide additional clarity and be specific as to which impoundments are being referred to in each instance.
23. Section 8.3.2 doesn't actually state specifically whether or not the maintenance of these impoundments is adequate.
24. Section 9.3.2 states that since "Detrimental conditions or indications for potential failure of embankments were not observed during CDM Smith's visual assessment. Therefore, the need for additional instrumentation to monitor structural stability, seepage, or ground movement is not indicated." However, in Appendix B, for the Upper East Pond, there is an affirmative response to history of significant seepages which appears to contradict the conclusion in section 9.3.2.
25. In Appendix B, the Liner question is addressed as "Not Applicable" in checklist sheet for the Upper East Pond, Upper Middle Pond, Upper West Pond, Middle Pond, and the Lower Pond. Please indicate whether or not a liner exists.
26. In Appendix B, a response to the following three questions was not included in the checklist sheets for each of the impoundments:
    - Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.
    - Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?
    - From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

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GULF POWER
A SOUTHERN COMPANY

October 29, 2013

By Overnight Delivery

Mr. Stephen Hoffman
Office of Resource Conservation and
Recovery
U.S. Environmental Protection Agency
Two Potomac Yard
2733 South Crystal Drive, 5th Floor, N-5237
Arlington, Virginia 22202-2733

Re: Draft Assessment of Dam Safety of Coal Combustion Surface Impoundments (October 2012)
Gulf Power Company
Plant Scholz
Sneads, Florida

Dear Mr. Hoffman:

By email dated September 30, 2013, the U.S. Environmental Protection Agency ("EPA") provided to Gulf Power Company ("GPC") the above-referenced report ("Draft Report") regarding the surface impoundment utilized for management of coal combustion residuals ("CCRs") generated at GPC's Plant Scholz ("Plant"). The Draft Report was prepared by CDM Smith ("CDM" or "Consultant") following CDM's August 22, 2012, Plant surface impoundment inspection and review of information provided to CDM by GPC both on and after August 22, 2012. Provided below are GPC's comments regarding the Draft Report. As well, GPC is providing specific responses to each of the recommendations set forth in the Draft Report which are found in Section 1.3 beginning on page 1-2 of the Draft Report. For ease of reference, the Draft Report recommendations are repeated in italics, followed by GPC's response.

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General Comments/Corrections

GPC Notes that the Draft Report is dated October 2012. GPC questions whether there is a typographical error in the Draft Report date and the date should be October 2013?

In **Section 2.1** of the Draft Report, the Consultant states:
Plant Scholz's Ash Pond consists of three separate units, the Upper Pond, the Middle Pond and the Lower Pond. Upper Pond is divided in three separate chambers functioning as settling ponds, which are designated as Upper East Pond, Upper Middle Pond and Upper West Pond.

While the description of the various areas within the ash pond is accurate, the presentation of the facility as "three separate units" is not. In reporting to the U.S. Environmental Protection Agency ("EPA") under the 2009 Information Request, the ash pond was considered a single ash management unit that was divided into separate areas for solids management and water treatment. This is the structure that GPC has maintained for some time, as supported by the NPDES permit issued by the Florida Department of Environmental Protection ("FDEP"). That permit was identified as Exhibit 19 and was provided to the Consultant during the August 2012 site inspection.

GPC respectfully requests that the Consultant revise the wording of the Draft Report text, in this specific reference and elsewhere, so that the ash management unit is considered a single unit, rather than multiple units.

While not specifically addressed in the Consultant's recommendations, this issue is referenced again in Section 5.5.2, where the Consultant characterizes the interior dikes of the Middle Pond as being in poor condition, with significant erosion features. This issue is also raised in Section 7.3, where the Consultant makes reference to the lack of documentation concerning the stability of the intermediate (or interior) dikes.

GPC disagrees with the Consultant's description of the condition of the interior divider dikes that help form the separate areas for solids management and water treatment. The references to these dikes in the Draft Report, as currently worded, suggest there is a dam safety concern with the condition of these slopes. It should be noted that these "interior slopes" are not intended to be engineered,

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structural slopes, and never have been. The integrity of these interior dikes has no impact on the structural integrity of the overall ash pond system. Thus, it is GPC's position that only the perimeter dikes should be considered in the assessment of the ash pond.

In **Section 2.1.2**, the comment is made that boring records associated with the north and east embankment assessment were not provided. Copies of these records are attached as Exhibit 32. Boring locations are shown on the drawing included in Appendix A of the Draft Report.

In **Section 2.3**, discussion is presented about the size and hazard rating assigned to the facility. Table 3 (Pg. 2-3) assigns a "Significant" hazard rating to each of the areas of the ash pond. As stated previously, GPC asserts that the ash pond should be considered a single unit, and only one hazard rating should be assigned to represent the management unit as a whole.

Additionally, GPC respectfully disagrees with the assigned hazard rating of "Significant". As defined on the EPA Checklist (Appendix B of the Draft Report), a Significant rating is defined as "those dams where failure or misoperation results in no probable loss of life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure." The basis for the assigned Significant hazard rating, as outlined in Table 3, varied slightly for the various areas, but in summary, the Draft Report states that dam "failure could result in economic loss and damage to plant infrastructure, operations and utilities, and environmental damage to adjacent waterways and downstream areas."

As provided in the Draft Report, the size classification for the ash pond is "Small" (Pg. 2-2), with a storage capacity of approximately 200 ac-ft. This equates to approximately less than 325,000 cubic yards, if the ash pond were filled to design capacity. Visual observations indicate that is not the case, and ash is dredged from the pond on a 2-3 year cycle to maintain sufficient water storage volume to meet NPDES permit storage requirements (approximately 53,000 cubic yards). The Plant generally exceeds this minimum required water storage volume. Furthermore, the Consultant was informed at the time of the inspection, that the Plant operates on a limited basis, generally only a few days

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(or partial days) a year. For the past several years, average annual ash disposal from Plant operations into the ash pond has been less than 10,000 cubic yards. Therefore, GPC maintains that any release of ash from the pond in the unlikely event of a failure would be limited in volume.

The generating units at the Plant are located east of the ash pond, and are separated from the pond itself by a drainage area that leads to controlled sumps, and by the coal storage area. There is little to no likelihood that there would be "damage to plant infrastructure, operations and utilities" in the unlikely event of a release. Were a release to occur, the adverse impact on power generation or reliability to the area is non-existent. Furthermore, it is worth noting that GPC has publicly announced that the Plant will cease coal-fired power generation in 2015.

Given the distance from the south embankment to the Apalachicola River and a maximum embankment height of the south embankment of less than 20 to 25 feet, the probability of a limited amount of ash traveling through heavily wooded areas in order to reach the river is low. As stated in Section 2-4 of the Draft Report, the Consultant offered the opinion that "a breach of the impoundment embankments would most likely impact low-lying lands surrounding the plant", and further stated "there is no critical infrastructure" between the impoundments and the Apalachicola River.

In conclusion, it is GPC's position that a "Low" hazard rating is more appropriate for this facility. As defined by EPA, a Low hazard rating applies when "failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property." In addition to the comments offered in the previous paragraphs, it should be noted that GPC's property line extends all the way to the river downslope of the ash pond. Therefore, any ash release would likely remain on the Plant property, limiting losses principally "to the owner's property."

In **Section 7.3**, reference is made to the lack of documentation relative to the design and construction of the west, south and interior embankments. As addressed previously, documentation on the south embankments has been provided as a part of this response to the Draft Report.

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As discussed in the preceding paragraphs, the interior embankments are not intended to be and should not be considered to be engineered, structural embankments, and they have no impact on the integrity of the ash pond as a whole. Should an interior embankment breach, there would be no risk of release of water or ash from the ash pond. Interior embankments should not be considered when developing a Condition Rating for the facility.

With regard to the west embankments, most of the west side of the pond is bounded by natural topography. Constructed embankments, if present, are generally only a few feet in height, and have slopes flatter than the remaining embankments. GPC maintains that the west embankments do not represent critical sections for the ash pond, and given the height and slope of these embankments, prudent engineering judgment and experience supports GPC's position that stability analyses would reveal factors of safety higher than those achieved for the north, south and east embankments. Given the configuration of the limited amount of earthen, constructed embankments on the west side, it is GPC's belief that separate stability analyses are not warranted.

As set forth in the following comments, significant work was undertaken after the August 2012, site inspection by GPC at the exterior slopes of the southern embankment to remove trees and other vegetation, repair erosion features, and flatten existing embankment slopes. GPC believes that these efforts along with the liquefaction potential analysis and other information provided in this response support a "Satisfactory" condition rating for the Plant impoundment.

GPC Responses to Draft Report Recommendations

1.3.2 Recommendations
Based on CDM Smith visual assessment of Ash Pond management units and review of documentation provided by Gulf Power and Southern Company, CDM Smith offers the following recommendations for consideration.

1.3.2.1 Recommendations Regarding the Hydrologic/Hydraulic Safety
Determine the PMP to complete technical documentation to confirm the condition and performance of these management units and substantiate an improved condition assessment.

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GPC Response:
In response to the Consultant's recommendation, GPC and its support staff from Southern Company researched the issue of the appropriate and legally applicable design storm. Multiple references are made in the Draft Report to FEMA publication methodology to determine design storms. GPC was unable to identify a specific reference on this point in several FEMA publications that were reviewed. However, some FEMA publications had internal references to publications and guidelines from other federal agencies. GPC's research did identify a reference in the U.S. Army Corp of Engineers ("Corps") Guidelines for Safety Inspection of Dams (1979) ("Corp Guidelines"). The Corps Guidelines were developed in response to Congress enacting the Dam Inspection Act of 1972 (Public Law 92-367). The law required the Corps to develop an inventory of all the dams in the United States, inspect them for safety, and then compile a report about those dams. This law, however, did not empower the Corps or EPA to regulate privately owned dams, but merely to collect information and develop safety standards. Recognizing that the Corps Guidelines are not legally applicable to the Plant ash pond, even if the referenced Corps Guidelines were applied, the appropriate storm size for a pond classified in the "Small" category (Pg 2-2 of the Draft Report) and a "Significant" hazard rating (Pg 2-3 of the Draft Report) is ½ probable maximum precipitation ("PMP"). Additional hydrologic/hydraulic analyses have been performed using the ½ PMP storm event, as reported in Calculation No. DC-FP-FPC34572-101, which is enclosed as Exhibit 33. The findings of this additional analysis indicate all areas of the ash pond will safely pass and/or store the ½ PMP rainfall event with the exception of the area designated as the "Middle Pond." The calculations indicate that the low point (EL 112) of the embankment around the Middle Pond will be overtopped during this rainfall event. However, it is important to note that the low point of the embankment is near the southeast corner of the Middle Pond, which is also the northeast portion of the South Pond, and if overtopping did occur, the flow of water would be to the South Pond. Thus, there is no risk of water or ash leaving the ash pond. Given that no overtopping of perimeter embankments occurs during the ½ PMP rainfall event, it is GPC's position that the ash pond will safely operate during such a storm event.

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1.3.2.2 Recommendations Regarding the Technical Documentation for Structural Stability

Stability analyses on different cross sections representing the typical embankments of the Ash Pond and liquefaction analyses are required to enable a satisfactory rating for structural stability.

GPC Response:

Additional analyses to assess the stability of the south embankments were completed shortly after the time of the Consultant's site visit to Plant Scholz. Results of those analyses indicated that factors of safety for various loading conditions met or exceeded those generally accepted by the industry.

In late 2012, GPC and the Plant initiated a project to address the downstream (exterior) slopes of the south embankment. Work included removal of trees and other vegetation, repair of erosion features, and general flattening of the slope. This work was completed in early 2013. Work was performed in accordance with the enclosed document identified as Exhibit 34 entitled "Sequential Plan for Tree Removal and Embankment Improvements, Ash Pond South Dike Embankment, Plant Scholz, Sneads, Florida." Although the plan provided for phased improvements over a period of years, the project was accelerated and completed over a period of months.

Subsequent to this work, a new topographic survey was prepared of the area, reflecting the improvements and flattened slopes. As the slopes had been modified, additional stability analyses were performed. Again, factors of safety met or exceeded generally accepted industry standards. A copy of Calculation No. TV-SZ-FPC33667-00 Rev 2 is enclosed for review as Exhibit 35. (This calculation supersedes Calculation No. TV-SZ-4161AK-001 previously provided at the time of the inspection and referenced in the Draft Report.)

Likewise, calculations to assess the liquefaction potential at the ash pond were performed subsequent to the actual inspection. Calculation No. TV-SZ-FPC33667-001 is enclosed for review as Exhibit 36. The analyses indicate that liquefaction of embankment or embankment foundation soils is not a concern.

As provided earlier, GPC maintains this remedial work, other work described herein, and the liquefaction potential analysis outlined above support a "Satisfactory" condition rating for the Plant ash pond.

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1.3.2.3 Recommendations Regarding Field Observations
Erosion rills and scarps – Erosion rills and scarps were observed on the exterior slopes of the south and southeast embankments of the Lower Pond. Place and compact structural fill in the rills and scarps and grade to adjacent existing contours. Trees and dense vegetation should be removed and embankments slopes be restored to the original contours by placing select structural fill in 12-inch lifts and compacting as recommended by a professional engineer.

After slope restoration, it is recommended to stabilize the exposed surface of the embankment with sod, hydro seeding, or riprap consisting of a heterogeneous mixture of irregular-shaped rocks placed over the compacted fill and a geotextile fabric.

Animal burrows were observed in several locations. Although not seen in other areas, vegetation cover may have hidden additional animal burrows. CDM Smith recommends documenting areas disturbed by animal activity, removing the animals and backfilling the burrows with compacted structural fill to protect the integrity of the embankments.

GPC Response:
As referenced in the response to the previous recommendation, GPC completed a project to address vegetation and erosion rills and scarps on the south and southeast embankments of the ash pond. As a part of this work, a large portion of the downstream slope was flattened. Photographic documentation and a topographic survey of the area taken after completion of the work are enclosed for review as Exhibit 37 and Exhibit 38. It is GPC's position that this recommendation has been successfully addressed in its entirety.

With respect to animal burrows, the weekly inspections performed by trained Plant personnel include notation and documentation of such animal burrows. These burrows are appropriately treated, when found, in accordance with the enclosed "Ash Pond Maintenance Plan, Plant Scholz, Sneads, Florida" which was previously provided and identified as Exhibit 28.

As mentioned previously, GPC's completed efforts to address vegetation and erosion rills and scarps on the south and southeast embankments of the ash pond, along with other information provided in this response supports a "Satisfactory" condition rating for the impoundment.

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1.3.2.4 Recommendations Regarding Surveillance and Monitoring Program
Monitoring for potential seepage at the toe of slope of the east embankment, where saturated areas were observed, is recommended.

GPC Response:
As reported to the Consultant at the time of the inspection, weekly inspections are performed by trained personnel from the Plant. A copy of the inspection checklist used was provided. Areas of seepage are noted during the inspections, and are given attention during subsequent inspections in order to assess flow changes in any seepage noted.

1.3.2.5 Recommendations Regarding Continued Safe and Reliable Operation
Inspections should be made following periods of heavy and/or prolonged rainfall and/or high water events on the Apalachicola River, and the occurrence of these events should be documented. Inspection records should be retained at the facility for a minimum of three years.

Major repairs and slope restoration should be designed by a registered professional engineer experienced with earthen dam design.

GPC Response:
In addition to the regular weekly inspections of the ash pond, Plant personnel are instructed to inspect the embankments following periods of heavy or prolonged rain events, and appropriate inspection records are prepared. These records are retained by the facility in accordance with established GPC and Southern Company policy.

Furthermore, major repairs and slope restoration projects, such as the ones completed in early 2013, are designed by registered professional engineers experienced with earthen dam design. Again, interface on these projects between the Plant and Southern Company is conducted in accordance with established GPC and Southern Company policy.

* * *

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GPC appreciates the opportunity to provide these comments regarding the Draft Report. GPC respectfully requests that all of the comments and additional information provided herein be incorporated into the next iteration of the Draft Report. As well, GPC requests that it be provided the additional opportunity to review and comment on the next version of the Draft Report before it is finalized by CDM and EPA.

Should you have any questions regarding the comments or information contained in this response, please do not hesitate to contact Mike Markey of Gulf Power Company at (850) 444-6573.

Sincerely,

James O. Vick

James O. Vick
Director
Environmental Affairs

cc: Chris Miller, Gulf Power Company
Mike Markey, Gulf Power Company
Jim Pegues, Southern Company Generation Technical Services
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GULF POWER
A SOUTHERN COMPANY

December 13, 2013

Stephen Hoffman
Office of Resource Conservation and Recovery
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW (5304P)
Washington, D.C. 20460

Re: Additional Information
Draft Assessment of Dam Safety of Coal Combustion Surface Impoundments (October 2012)
Gulf Power Company - Plant Scholz

Dear Mr. Hoffman:

Thank you for talking with us on December 5, 2013, regarding the above-referenced draft CDM Smith Report (Draft Report) and Gulf Power Company's (GPC) October 29, 2013, response to the Draft Report. As a result of our discussion, GPC now better understands CDM Smith's rationale for considering the ash pond to be three separate units based on water level (i.e., head) differential and the potential for a progressive failure impacting the overall ash management unit. Nevertheless, as stated in its response, it is GPC's position that the ash pond should be considered one management unit, rather than three units. To further support its position, GPC obtained some additional site-specific information which is provided below.

As discussed during the December 5 call, the various cells within the ash pond are hydraulically connected through the use of various pipes and culverts that function through gravity flow. There is no pumping or other supportive mechanical means needed or used to move water from one cell to another. GPC acknowledges that the information contained in the Hydrologic and Hydraulic calculation may be confusing with regard to head differential between cells. A cursory review of the information used in that calculation suggests a difference in water level between the upper pond and the lower pond on the order of 30 feet.

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However, that is not representative of actual field conditions, as the differences in water levels in each cell are nominal. On December 5, GPC had Plant Scholz personnel record measurements of the water depths. The depths were as follows:

Upper Pond ~20 inches
Middle Pond ~23 inches
Lower Pond ~34 inches

As reflected above, there is only a nominal head differential between the various cells. Although it appears there is a much larger differential due to depth of ash in the cells and the original topography of the site, there is minimal risk of a progressive failure resulting from the unexpected breach or failure of one of the internal divider dikes. We recognize EPA's position and concerns regarding this issue, but it continues to be GPC's position that the physical conditions and configuration of the ash pond at Plant Scholz represent a low head condition with minimal risk of internal dike breach or failure. As an illustration, Photo 31 in the Draft Report shows the divider dike between the middle and lower pond. This divider dike is very wide, and is not conducive to causing a progressive failure given the load head conditions. Photos 79, 80, 93 and 94 (as well as others) in the Draft Report provide additional views of other divider dikes illustrating similar conditions.

GPC appreciates the opportunity to provide EPA with this additional information. GPC assumes that EPA will share this information with CDM Smith. If that is not the case, let me know and GPC will provide this directly to CDM Smith. Thanks again.

Sincerely,

James O. Vick
Director Environmental Affairs

cc: Chris Miller, Gulf Power Company
Mike Markey, Gulf Power Company
Jim Pegues, Southern Company Generation Technical Services
Russell A. Badders, Esq., Beggs & Lane
Michael P. Petrovich, Esq., Hopping Green & Sams

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 134.7 **COORDINATES:** N 606,932.81 E 1,846,006.49
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 61 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	2-3-2 (5)	100	
5				SS -2	4.5-6.0	2-2-2 (4)	100	
				SS -3	7.5-9.0	3-4-3 (7)	100	
10				SS -4	9.5-11.0	1-3-5 (8)	100	
15				SS -5	14.5-16.0	6-7-9 (16)	100	
20				SS -6	19.5-21.0	6-7-6 (13)	100	
25				SS -7	24.5-26.0	2-3-3 (6)	100	
30				SS -8	29.5-31.0	3-2-3 (5)	100	
35				SS -9	34.5-36.0	3-2-2 (4)	100	

(Continued Next Page)

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LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Silty Sand (SM)** - brown, moist, loose, low plasticity	95.2	SS -10	39.5-41.0	2-1-2 (3)	100	
45		**Coal Combustion Byproduct (ASH)** - black, wet, very loose, no plasticity, with fine sand	90.2	SS -11	44.5-46.0	WH-WH-1 (1)	100	(MC = 23.5%; PL=NP; FC = 92.3%)
50		**Poorly-graded Sand (SP)** - brown, wet, loose to medium dense, fine grain	85.2	SS -12	49.5-51.0	2-1-4 (5)	100	(MC = 16.4%; PL=NP; FC = 28.2%)
55				SS -13	54.5-56.0	3-4-7 (11)	100	
60			73.7	SS -14	59.5-61.0	24-26-35 (61)	100	(MC = 33%; LL=53; PI=32; FC = 48.8%)
		Bottom of borehole at 61.0 feet.						
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 134.1 **COORDINATES:** N 607,047.50 E 1,845,988.23
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 56 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	4-7-8 (15)	100	
5				SS -2	4.5-6.0	4-5-5 (10)	100	
				SS -3	7.5-9.0	3-4-4 (8)	100	
10				SS -4	9.5-11.0	2-2-5 (7)	100	
			119.6					
15		**Poorly-graded Sand (SP)** - dark br, very moist, loose, no plasticity		SS -5	14.5-16.0	2-2-2 (4)	100	
			114.6					
20		**Coal Combustion Byproduct (ASH)** - blackish gray, wet, loose, no plasticity		SS -6	19.5-21.0	1-1-1 (2)	100	
25				SS -7	24.5-26.0	WH-WH-WH (0)	100	(MC = 36.6%; PL=NP; FC = 74.7%)
30				SS -8	29.5-31.0	1-1-2 (3)	100	
35				SS -9	34.5-36.0	2-2-3 (5)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Coal Combustion Byproduct (ASH)***(con't)*		SS -10	39.5-41.0	WH-WH-2 (2)	100	
			89.6					
45		**Silty Sand (SM)** - tan, wet, loose, no plasticity, fine to medium grain		SS -11	44.5-46.0	WH-WH-2 (2)	100	(MC = 15.8%; FC = 12.2%)
			84.6					
50		**Poorly-graded Sand (SP)** - tan, wet, dense, fine to medium grain		SS -12	49.5-51.0	5-5-15 (20)	100	
55			78.1	SS -13	54.5-56.0	13-50 (50)	56	
		Bottom of borehole at 56.0 feet.						
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 134.3 **COORDINATES:** N 607,167.33 E 1,845,960.46
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 55 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 22 ft. after 24 hrs.
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	3-3-3 (6)	100	
5				SS -2	4.5-6.0	2-3-3 (6)	100	
				SS -3	7.5-9.0	2-2-2 (4)	100	
10				SS -4	9.5-11.0	3-2-3 (5)	100	
15				SS -5	14.5-16.0	4-5-7 (12)	100	
20		▼		SS -6	19.5-21.0	4-6-8 (14)	100	
25				SS -7	24.5-26.0	1-1-3 (4)	100	
30				SS -8	29.5-31.0	1-1-2 (3)	100	
35				SS -9	34.5-36.0	2-3-2 (5)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40			94.8					
		Well-graded Sand with Silt (SW-SM) - black, tan and brown, moist, v. loose to dense, no plasticity, fine to medium grain		SS -10	39.5-41.0	WH-WH-2 (2)	100	(MC = 39.2%; FC = 11.3%)
45				SS -11	44.5-46.0	10-23-24 (47)	100	
			84.8					
50		**Poorly-graded Sand with Silt (SP-SM)** - black, tan and brown, moist, very loose, no plasticity, with gravel		SS -12	49.5-51.0	WH-10-2 (12)	100	(MC = 13.8%; FC = 9.9%)
			79.8					
55		**Poorly-graded Sand (SP)** - gray, moist, very dense	79.3	SS -13	54.5-56.0	5-10-50 (60)	89	
		Bottom of borehole at 55.0 feet.						
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 135.1 **COORDINATES:** N 607,287.08 E 1,845,929.45
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	3-5-6 (11)	100	
5				SS -2	4.5-6.0	3-3-2 (5)	100	
				SS -3	7.5-9.0	2-2-2 (4)	100	
10				SS -4	9.5-11.0	3-6-7 (13)	100	
15				SS -5	14.5-16.0	2-2-2 (4)	100	
20				SS -6	19.5-21.0	3-4-4 (8)	100	
25				SS -7	24.5-26.0	3-4-4 (8)	100	
30				SS -8	29.5-31.0	1-1-2 (3)	100	
35				SS -9	34.5-36.0	WH-1-2 (3)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Silty Sand (SM)** - black, wet, loose to medium dense, no plasticity	95.6	SS -10	39.5-41.0	WH-WH-4 (4)	100	(MC = 37.2%; PL=NP; FC = 29.2%)
45				SS -11	44.5-46.0	4-6-8 (14)	100	
50		**Poorly-graded Sand (SP)** - tan/br, very damp, dense	85.6 84.1	SS -12	49.5-51.0	3-16-24 (40)	100	
		Bottom of borehole at 51.0 feet.						
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 135.2 **COORDINATES:** N 607,400.29 E 1,845,898.98
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 46 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp to wet, no plasticity						
				SS -1	2.5-4.0	3-5-4 (9)	100	
5				SS -2	4.5-6.0	2-1-2 (3)	100	
				SS -3	7.5-9.0	1-2-2 (4)	100	
10				SS -4	9.5-11.0	2-2-3 (5)	100	
15				SS -5	14.5-16.0	2-1-1 (2)	100	
20				SS -6	19.5-21.0	2-3-3 (6)	100	
25				SS -7	24.5-26.0	2-3-5 (8)	100	
30				SS -8	29.5-31.0	1-1-1 (2)	100	(MC = 48.8%; FC = 85.6%)
35				SS -9	34.5-36.0	1-2-3 (5)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Poorly-graded Sand with Silt (SP-SM)** - brown, very damp, medium dense, low plasticity	95.7	SS -10	39.5-41.0	6-9-12 (21)	100	(MC = 14.8%; LL=28; PI=5; FC = 8.9%)
45		**Coal Combustion Byproduct (ASH)** - tannish black, moist, medium dense, no plasticity	90.7 89.2	SS -11	44.5-46.0	1-3-13 (16)	100	(MC = 22.2%; FC = 90.9%)
		Bottom of borehole at 46.0 feet.						
50								
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/1/2010 **COMPLETED** 3/1/2010 **SURF. ELEV.** 134.1 **COORDINATES:** N 607,518.54 E 1,845,865.70
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 46 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	1-1-2 (3)	100	
5				SS -2	4.5-6.0	1-2-2 (4)	100	
				SS -3	7.5-9.0	WH-WH-WH (0)	100	(MC = 66.5%; FC = 90%)
10		- wet below 9.5 ft.		SS -4	9.5-11.0	1-2-1 (3)	100	
15				SS -5	14.5-16.0	1-1-1 (2)	100	(MC = 38.4%; FC = 79.4%)
20				SS -6	19.5-21.0	2-4-3 (7)	100	
25				SS -7	24.5-26.0	WH-WH-WH (0)	100	(MC = 63.8%; FC = 87.1%)
30				SS -8	29.5-31.0	WH-WH-1 (1)	100	
35				SS -9	34.5-36.0	WH-WH-2 (2)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40			94.6					
		Poorly-graded Sand (SP) - brown, very damp, med dense to very dense		SS -10	39.5-41.0	3-6-8 (14)	100	
45			88.1	SS -11	44.5-46.0	35-38-50 (88)	87	
		Bottom of borehole at 46.0 feet.						
50								
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 132.9 **COORDINATES:** N 607,668.59 E 1,845,828.53
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 41 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 23.5 ft. after 24 hrs.
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, loose, no plasticity						
				SS -1	2.5-4.0	2-2-2 (4)	100	
5				SS -2	4.5-6.0	1-1-2 (3)	100	
				SS -3	7.5-9.0	1-1-1 (2)	100	
10				SS -4	9.5-11.0	2-2-2 (4)	100	
15				SS -5	14.5-16.0	2-2-2 (4)	100	
20				SS -6	19.5-21.0	1-1-3 (4)	100	
		▼						
25				SS -7	24.5-26.0	WH-1-1 (2)	100	
30				SS -8	29.5-31.0	WH-1-1 (2)	100	(MC = 53.2%; FC = 83.5%)
			98.4					
35		**Poorly-graded Sand (SP)** - red/white, very damp, medium dense		SS -9	34.5-36.0	4-7-8 (15)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Poorly-graded Sand (SP)***(con't)*	91.9	SS -10	39.5-41.0	4-5-10 (15)	100	
		Bottom of borehole at 41.0 feet.						
45								
50								
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 133.5 **COORDINATES:** N 607,816.08 E 1,845,792.45
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, loose, no plasticity		SS -1	2.5-4.0	4-4-5 (9)	100	
5				SS -2	4.5-6.0	1-1-4 (5)	100	
			126.0					
		Poorly-graded Sand (SP) - brown, damp, medium dense, no plasticity, fine to coarse grain, trace gravel	124.0	SS -3	7.5-9.0	5-7-9 (16)	100	
10		**Coal Combustion Byproduct (ASH)** - black, damp, loose, no plasticity		SS -4	9.5-11.0	2-2-3 (5)	100	
15				SS -5	14.5-16.0	8-5-6 (11)	100	
			114.0					
20		**Silty Sand (SM)** - tan and brown, wet, medium dense, no plasticity		SS -6	19.5-21.0	7-6-8 (14)	100	(MC = 11.6%; PL=NP; FC = 32.8%)
			109.0					
25		**Clayey Sand (SC)** - brown, wet, loose, low plasticity		SS -7	24.5-26.0	3-2-2 (4)	100	(MC = 18.4%; LL=24; PI=13; FC = 31.9%)
			104.0					
30		**Silty Sand (SM)** - tannish red, moist, medium dense, no plasticity		SS -8	29.5-31.0	6-6-8 (14)	100	(MC = 18.4%; PL=NP; FC = 43.4%)
			99.0					
35		**Poorly-graded Sand (SP)** - tan and brown, very damp, loose	97.5	SS -9	34.5-36.0	6-5-4 (9)	100	
		Bottom of borehole at 36.0 feet.						

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 135.1 **COORDINATES:** N 607,905.14 E 1,845,697.72
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Clayey Sand (SC) - red, moist, loose, low plasticity						
				SS -1	2.5-4.0	4-2-2 (4)	100	
5			130.6					
		Coal Combustion Byproduct (ASH) - black, wet, very loose		SS -2	4.5-6.0	WH-1-1 (2)	100	(MC = 51.1%; PL=NP; FC = 62.5%)
			127.6					
		Poorly-graded Sand (SP) - white and tan, wet, medium dense		SS -3	7.5-9.0	3-5-6 (11)	100	
10			125.6					
		Coal Combustion Byproduct (ASH) - black, wet, loose		SS -4	9.5-11.0	4-4-4 (8)	100	
			120.6					
15		**Poorly-graded Sand (SP)** - tan and red, wet, medium dense		SS -5	14.5-16.0	7-9-9 (18)	100	
20				SS -6	19.5-21.0	10-13-14 (27)	100	
			110.6					
25		**Clayey Sand (SC)** - tan and red, wet, very loose, medium plasticity		SS -7	24.5-26.0	1-2-2 (4)	100	
			106.1					
30		**Sandy Fat Clay (CH)** - reddish gray, moist, stiff, low plasticity		SS -8	29.5-31.0	6-5-7 (12)	100	(MC = 19.4%; LL=51; PI=29; FC = 67.4%)
			100.6					
35		**Clayey Sand (SC)** - red and brown, moist, medium dense, no plasticity	99.1	SS -9	34.5-36.0	6-9-8 (17)	100	
		Bottom of borehole at 36.0 feet.						

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 134.5 **COORDINATES:** N 607,867.70 E 1,845,565.08
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 10.9 ft. after 24 hrs.
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - red and black, moist		SS -1	2.5-4.0	1-1-1 (2)	100	
5		- black		SS -2	4.5-6.0	1-2-2 (4)	100	
		- tan and black	125.0	SS -3	7.5-9.0	2-3-4 (7)	100	
10		**Silty Sand (SM)** - red, moist, medium dense, fine to medium grain		SS -4	9.5-11.0	3-5-5 (10)	100	
15		- tan and brown		SS -5	14.5-16.0	11-12-13 (25)	100	(MC = 12.2%; FC = 19.3%)
20				SS -6	19.5-21.0	10-11-14 (25)	100	
25		**Clayey Sand (CL)** - red, brown and gray, wet, medium dense, low plasticity, fine to medium grain	110.0	SS -7	24.5-26.0	5-6-6 (12)	100	(MC = 16.1%; LL=46; PI=27; FC = 47.2%)
30				SS -8	29.5-31.0	4-3-5 (8)	100	
35		**Poorly-graded Sand (SP)** - white and tan, moist, dense	100.0 98.5	SS -9	34.5-36.0	15-40-49 (89)	100	
		Bottom of borehole at 36.0 feet.						

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/16/2010 **COMPLETED** 2/16/2010 **SURF. ELEV.** 133.8 **COORDINATES:** N 607,841.00 E 1,845,475.95
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - dark gray, damp, loose						
				SS -1	2.5-4.0	2-2-3 (5)	100	
5				SS -2	4.5-6.0	2-3-4 (7)	100	
			126.3					
		Clayey Sand (SC) - red, wet, medium dense, low plasticity, fine to medium grain	124.3	SS -3	7.5-9.0	4-7-8 (15)	100	(MC = 30.8%; LL=28; PI=10; FC = 29.5%)
10		**Poorly-graded Sand (SP)** - red/tan/br, moist, medium dense		SS -4	9.5-11.0	5-7-8 (15)	100	
15				SS -5	14.5-16.0	9-13-15 (28)	100	
			114.3					
20		**Silty Sand (SM)** - gray, moist, medium dense, fine to medium grain		SS -6	19.5-21.0	8-9-10 (19)	100	(MC = 11.3%; PL=NP; FC = 16.5%)
			109.3					
25		**Poorly-graded Sand (SP)** - white/tan/br/gray, moist, loose		SS -7	24.5-26.0	5-3-3 (6)	100	
			104.3					
30		**Sandy Silt (ML)** - brown, moist, very dense		SS -8	29.5-31.0	17-30-50 (80)	83	(MC = 13.9%; FC = 54.5%)
35				SS -9	34.5-36.0	15-33-50 (83)	87	
			97.8					
		Bottom of borehole at 36.0 feet.						

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/16/2010 **COMPLETED** 2/16/2010 **SURF. ELEV.** 132.2 **COORDINATES:** N 607,784.60 E 1,845,394.55
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, wet		SS -1	2.5-4.0	3-4-5 (9)	100	
5				SS -2	4.5-6.0	2-2-3 (5)	100	
				SS -3	7.5-9.0	WH-WH-WH (0)	100	
10				SS -4	9.5-11.0	WH-WH-WH (0)	100	(MC = 69.7%; PL=NP; FC = 92.9%)
15				SS -5	14.5-16.0	WH-WH-WH (0)	100	(MC = 61.1%; PL=NP; FC = 95.6%)
20			112.7					
		Clayey Sand (SC) - tan and brown, very damp, loose, low plasticity		SS -6	19.5-21.0	3-3-5 (8)	100	
25			107.7					
		Poorly-graded Sand (SP) - tan, moist, very dense		SS -7	24.5-26.0	15-47-50 (97)	87	
30				SS -8	29.5-31.0	10-27-50 (77)	87	
35				SS -9	34.5-36.0	29-50 (50)	60	
			96.2					
		Bottom of borehole at 36.0 feet.						

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number: DC-FP-FPC34572-101

Project/Plant: Plant Scholz Ash Ponds	**Unit(s):** 1	**Discipline/Area:** Civil
Title/Subject: Hydrologic and Hydraulic Study		
Purpose/Objective: Determine the maximum pool elevations in the ash pond cells using the ½ PMP event.		
System or Equipment Tag Numbers:	**Originator:** Jim Minor	

Contents

Topic	Page	Attachments (Computer Printouts, Tech. Papers, Sketches, Correspondence)	# of Pages
Purpose of Calculation	1		1
Summary of Conclusions	2		1
Methodology	1		1
Assumptions	1-3		3
Criteria	1-3		3
Design Inputs/References	4-32		29
Body of Calculation	4-32		29
Total # of pages including cover sheet & attachments:	33		

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for review	JWM/10-2013	PMG/10-2013	KAM 10/18/13

Notes:

SOUTHERN COMPANY

Design Calculations

Project	Prepared By	Date
PLANT SCHERER	JWM	10/16/13
Subject/Title: ASH POND HYDROLOGIC & HYDRAULIC ANALYSIS	Reviewed By: ~~PMG~~	Date: 10/2013
	Calculation Number: DC-FP-FPC34572-101	Sheet: 1 of 32

TASK

ANALYZE THE ASH POND CAPACITY DURING THE PROBABLE MAXIMUM PRECIPITATION - 24 HR STORM EVENT.

ASSUMPTIONS & CRITERIA

- SCHERER IS IN JACKSON COUNTY
- RAINFALL DISTRIBUTION IS TYPE III
- HSG → C, D, & A (SEE SOIL REPORT)
- PMP IS 47" FOR JACKSON COUNTY (½ PMP IS 23.5")
- USE SCS TR-55 METHOD TO DETERMINE PEAK FLOW & MAX. ELEVATIONS IN CELLS.

DRAINAGE BASIN AREAS ARE LISTED ON SHT 11-12 OF 38 IN CALCULATION DC-FP-FPC34572-100.

CURVE NO. INFORMATION CAN BE FOUND ON SHT 11-12 OF 38 IN CALCULATION DC-FP-FPC34572-100.

TIME OF CONCENTRATION

BECAUSE RAIN FALLS DIRECTLY ON LOADS, THE MINIMUM T_c WILL BE USED, 0.1 HR OR 6 MIN.

SOUTHERN COMPANY

Design Calculations

Project	Prepared By	Date
PLANT SCHERER	JWM	10/16/13
Subject/Title	**Reviewed By**	**Date**
ASH POND HYDROLOGIC & HYDRAULIC ANALYSIS	DMB	10/2013
	Calculation Number DC-FP-FPL3HST2-101	**Sheet** 2 of 32

STAGE STORAGE DATA FOR EACH CELL

THE STAGE STORAGE DATA IS SHOWN ON SHEETS 13 & 14 OF 38 IN CALCULATION DC-FP-FPL3HST2-100.

SUMMARY OF CELL MAXIMUM POOL ELEVATIONS FOR EACH CELL

	EAST UPPER POND (CFS)	CENTRAL UPPER POND (CFS)	WEST UPPER POND (CFS)	MIDDLE POND (CFS)	LOWER POND (CFS)
½ PMP PEAK FLOW	87.00	76.37	170.77	235.75	172.63
½ PMP MAX POOL ELEVATION	127.97	125.61	122.10	117.00	100.98
TOP OF DIKE ELEVATION	131.00	128.00	123.00	112.00	104.00
FREEBOARD	3.03	2.39	1.50	OVERTOPS	3.02
FREEBOARD @ NORMAL POOL	3.00	3.69	0.9	2.00	5.84
NORMAL POOL	128.00	124.31	122.10	110.00	98.16

REFER TO SHEETS 4 THROUGH 10 FOR SOFTWARE OUTPUT.

SOUTHERN COMPANY

Design Calculations

Project	Prepared By	Date
PLANT SCHOLZ	JWM	10/16/13
Subject/Title	Reviewed By	Date
ASH POND HYDROLOGIC & HYDRAULIC ANALYSIS	PMB	10/22/2013
	Calculation Number	Sheet
	DC-FP-FPC345T2-101	3 of 32

SINCE MIDDLE POND OVERTOPS, CONSIDER RAISING TOP OF DIKE TO INCREASE STORAGE USING STAGE STORAGE ASSUMPTION BELOW:

EL	AREA	VOL
106	576	—
107	2839	1708
108	9583	7919
109	40,545	32983
110	89,203	93,357 (CURRENT W.S.E.)
111	118,360	192,638
112	154,649	329,143
113	154,649	483,792
114	154,649	638,441

USING ABOVE DATA MAX WATER SURFACE ELEVATION IS 113.73

REFER TO SHEETS 11 THRU 17 FOR SOFTWARE OUTPUT.

Prep By JWM	Date 10/17/13
Rev By JMB	Date 10/2013
Calc No. DE-EP-FR2345D-201	Sheet 4 of 32

Autodesk® Storm and Sanitary Analysis 2013 - Version 7.1.2186 (Build 1)

****
Project Description
****
File Name ..... Plant Scholz Ash Cell 10-08-13.SPF

****
Analysis Options
****
Flow Units ..... cfs
Subbasin Hydrograph Method. SCS TR-55
Time of Concentration..... User-Defined
Link Routing Method ..... Kinematic Wave
Storage Node Exfiltration.. None
Starting Date JUN-14-2011 00:00:00
Ending Date JUN-15-2011 00:00:00
Report Time Step 00:05:00

****
Element Count
****
Number of rain gages 1
Number of subbasins 5
Number of nodes 8
Number of links 11

****
Raingage Summary
****

Gage ID	Data Source	Data Type	Recording Interval min
Design Storm	1/2 PMP	CUMULATIVE	6.00

****
Subbasin Summary
****

Subbasin ID	Total Area acres
Central Upper Cell	4.37
East Upper	4.70
Lower	11.92
Middle	12.90
West Upper Cell	7.16

****
Node Summary
****

Node ID	Element Type	Invert Elevation	Maximum Elev.	Ponded Area	External Inflow

Prep By	JWM	Date	10/17/13
Rev By	PMB	Date	10/2.013
Calc No. ft DE-FP-FR3152101		Sheet	5 of 32

Junction 1	JUNCTION	102.03	109.74	0.00	
Junction 2	JUNCTION	78.31	97.57	0.00	
Outlet	OUTFALL	71.16	74.16	0.00	
Central Cell	STORAGE	112.00	128.00	0.00	
East Cell	STORAGE	116.00	131.00	0.00	Yes
Lower Cell	STORAGE	92.00	104.00	0.00	Yes
Middle Cell	STORAGE	106.00	112.00	0.00	
West Cell	STORAGE	102.00	123.00	0.00	Yes

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
Central Pipe	Central Cell	West Cell	CONDUIT	58.0	4.6207	0.0120
East Cell Pipe	East Cell	Central Cell	CONDUIT	44.0	0.5000	0.0110
East Pipe 1	West Cell	Middle Cell	CONDUIT	66.0	0.7424	0.0110
East Pipe 2	West Cell	Middle Cell	CONDUIT	39.0	7.9487	0.0110
East Pipe 3	West Cell	Middle Cell	CONDUIT	66.0	0.5000	0.0110
East Pipe 4	West Cell	Middle Cell	CONDUIT	38.0	11.5526	0.0110
Middle Pipe	Middle Cell	Lower Cell	CONDUIT	49.0	19.7959	0.0150
Middle Riser Pipe	Junction 1	Lower Cell	CONDUIT	66.0	4.0000	0.0120
Outlet Pipe	Junction 2	Outlet	CONDUIT	173.0	4.1329	0.0120
Riser	Lower Cell	Junction 2	ORIFICE			
Riser at Middle Cell	Middle Cell	Junction 1	ORIFICE			

****
Cross Section Summary
****

Link ID	Shape	Depth/ Diameter ft	Width ft	No. of Barrels	Cross Sectional Area ft²	Full Flow Hydraulic Radius ft	Design Flow Capacity cfs
Central Pipe	CIRCULAR	1.50	1.50	2	1.77	0.38	24.46
East Cell Pipe	CIRCULAR	2.00	2.00	1	3.14	0.50	18.90
East Pipe 1	CIRCULAR	0.83	0.83	1	0.55		

0.21	2.23				
East Pipe 2	CIRCULAR	1.00	1.00	1	0.79
0.25	11.87				
East Pipe 3	CIRCULAR	1.50	1.50	1	1.77
0.38	8.78				
East Pipe 4	CIRCULAR	1.50	1.50	1	1.77
0.38	42.19				
Middle Pipe	CIRCULAR	1.50	1.50	1	1.77
0.38	40.50				
Middle Riser Pipe	CIRCULAR	2.25	2.25	1	3.98
0.56	67.10				
Outlet Pipe	CIRCULAR	3.00	3.00	1	7.07
0.75	146.90				

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	81.634	23.864
Surface Runoff	5.865	1.714
Continuity Error (%)	-0.000	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	65.409	21.315
Initial Stored Volume	68.023	22.166
Final Stored Volume	61.438	20.020
Continuity Error (%)	0.000	

Composite Curve Number Computations Report

Subbasin Central Upper Cell

Soil/Surface Description	Area (acres)	Soil Group	CN
-	3.00	-	48.00
-	1.37	-	98.00
Composite Area & Weighted CN	4.37		63.68

Subbasin East Upper

Soil/Surface Description	Area (acres)	Soil Group	CN
-	2.40	-	

48.00			
-		2.30	-
98.00			
Composite Area & Weighted CN		4.70	
72.47			

Subbasin Lower

Soil/Surface Description		Area (acres)	Soil Group
CN			
-		11.92	-
48.00			
Composite Area & Weighted CN		11.92	
48.00			

Subbasin Middle

Soil/Surface Description		Area (acres)	Soil Group
CN			
-		7.22	-
48.00			
-		5.68	-
98.00			
Composite Area & Weighted CN		12.90	
70.02			

Subbasin West Upper Cell

Soil/Surface Description		Area (acres)	Soil Group
CN			
-		5.48	-
48.00			
-		1.68	-
98.00			
Composite Area & Weighted CN		7.16	
59.73			

****
Subbasin Runoff Summary
****

Subbasin ID	Total Precip in	Total Runoff in	Peak Runoff cfs	Weighted Curve Number	Time of Concentration days hh:mm:ss
Central Upper Cell	23.50	17.82	76.37	63.680	0 00:06:00
East Upper	23.50	19.48	87.00	72.470	0 00:06:00

Plant Scholz Half PMP

Lower	23.50	14.15	172.63	48.000	0	00:06:00
Middle	23.50	19.04	235.75	70.020	0	00:06:00
West Upper Cell	23.50	16.98	120.77	59.730	0	00:06:00

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
Junction 1	0.82	0.91	102.94	0	12:20	0	0	0:00:00
Junction 2	0.96	1.14	79.45	0	17:05	0	0	0:00:00
Outlet	0.96	1.13	72.29	0	17:05	0	0	0:00:00
Central Cell	12.66	13.61	125.61	0	13:06	0	0	0:00:00
East Cell	9.76	11.97	127.97	0	00:00	0	0	0:00:00
Lower Cell	7.60	8.98	100.98	0	17:05	0	0	0:00:00
Middle Cell	5.31	6.00	112.00	0	12:21	84.70	104	0:00:00
West Cell	18.57	20.10	122.10	0	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days hh:mm
Junction 1	JUNCTION	0.00	23.27	0	12:20	0.00	
Junction 2	JUNCTION	0.00	44.67	0	17:05	0.00	
Outlet	OUTFALL	0.00	44.67	0	17:05	0.00	
Central Cell	STORAGE	75.50	88.56	0	12:10	0.00	
East Cell	STORAGE	88.09	88.09	0	12:10	0.00	

Plant Scholz Half PMP

Lower Cell	STORAGE	168.90	231.40	0	12:10	0.00	
Middle Cell	STORAGE	233.71	276.03	0	12:10	211.74	0
12:10							
West Cell	STORAGE	121.01	146.91	0	12:10	0.00	

****
Storage Node Summary
****

Storage Node	Storage Node ID Outflow cfs	Maximum Exfiltration Rate cfm	Maximum Ponded Exfiltration Volume 1000 ft³	Time of Max. Ponded Exfiltration Rate hh:mm:ss	Maximum Exfiltrated Volume (%) 1000 ft³	Time of Max Total Ponded Volume days hh:mm	Average Ponded Volume 1000 ft³	Average Ponded Volume (%)
Central Cell	26.47	0.00	540.216	0:00:00	61 0.000	0 13:06	450.080	51
East Cell	18.90	0.00	1195.107	0:00:00	72 0.000	0 00:00	836.521	51
Lower Cell	44.67	0.00	952.003	0:00:00	41 0.000	0 17:04	478.569	21
Middle Cell	62.50	0.00	329.142	0:00:00	100 0.000	0 12:03	233.345	71
West Cell	57.72	0.00	1159.063	0:00:00	87 0.000	0 00:00	890.339	67

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
Outlet	100.00	32.97	44.67
System	100.00	32.97	44.67

****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence	Maximum Velocity Attained	Length Factor	Peak Flow during Analysis Flow	Design Capacity	Ratio of Maximum /Design	Ratio of Maximum Flow	Total Reported Condition Surcharged

Plant Scholz Half PMP

				days hh:mm	ft/sec		cfs
cfs	Flow	Depth	minutes				
Central Pipe		CONDUIT	0	15:35	14.11	1.00	26.47
48.92	0.54	0.52	0	Calculated			
East Cell Pipe		CONDUIT	0	04:18	6.89	1.00	19.84
18.90	1.05	1.00	1	SURCHARGED			
East Pipe 1		CONDUIT	0	00:01	4.09	1.00	2.23
2.23	1.00	1.00	1440	SURCHARGED			
East Pipe 2		CONDUIT	0	00:01	14.71	1.00	4.75
11.87	0.40	0.43	0	Calculated			
East Pipe 3		CONDUIT	0	00:01	4.97	1.00	8.78
8.78	1.00	1.00	1440	SURCHARGED			
East Pipe 4		CONDUIT	0	00:55	27.25	1.00	44.28
42.19	1.05	1.00	0	> CAPACITY			
Middle Pipe		CONDUIT	0	12:05	26.11	1.00	39.23
40.50	0.97	0.79	0	Calculated			
Middle Riser Pipe		CONDUIT	0	12:05	15.33	1.00	23.27
67.10	0.35	0.41	0	Calculated			
Outlet Pipe		CONDUIT	0	17:05	18.23	1.00	44.67
146.90	0.30	0.38	0	Calculated			
Riser		ORIFICE	0	17:05			44.67
Riser at Middle Cell		ORIFICE	0	12:20			23.27

****
Highest Flow Instability Indexes
****
Link Middle Pipe (7)
Link East Pipe 4 (7)
Link Central Pipe (3)
Link East Cell Pipe (2)

WARNING 107 : Initial water surface elevation defined for Junction Junction 1 is below junction invert elevation.
Assumed initial water surface elevation equal to invert elevation.
WARNING 108 : Surcharge elevation defined for Junction Junction 1 is below junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.
WARNING 107 : Initial water surface elevation defined for Junction Junction 2 is below junction invert elevation.
Assumed initial water surface elevation equal to invert elevation.
WARNING 108 : Surcharge elevation defined for Junction Junction 2 is below junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.

Analysis began on: Thu Oct 17 11:00:23 2013
Analysis ended on: Thu Oct 17 11:00:24 2013
Total elapsed time: 00:00:01

Prep By JWM	Date 10/17/13
Rev By JMB	Date 10/2013
Calc No. PLT-[illegible]	Sheet 1 of 32

Plant Scholz Half PMP Option 1

Autodesk® Storm and Sanitary Analysis 2013 - Version 7.1.2186 (Build 1)

****
Project Description
****
File Name ..... Plant Scholz Ash Cell 10-08-13 Option 1.SPF

****
Analysis Options
****
Flow Units ..... cfs
Subbasin Hydrograph Method. SCS TR-55
Time of Concentration..... User-Defined
Link Routing Method ..... Kinematic Wave
Storage Node Exfiltration.. None
Starting Date JUN-14-2011 00:00:00
Ending Date JUN-15-2011 00:00:00
Report Time Step 00:05:00

****
Element Count
****
Number of rain gages 1
Number of subbasins 5
Number of nodes 8
Number of links 11

****
Raingage Summary
****

Gage ID	Data Source	Data Type	Recording Interval min
Design Storm	1/2 PMP	CUMULATIVE	6.00

****
Subbasin Summary
****

Subbasin ID	Total Area acres
Central Upper Cell	4.37
East Upper	4.70
Lower	11.92
Middle	12.90
West Upper Cell	7.16

****
Node Summary
****

Node ID	Element Type	Invert Elevation	Maximum Elev.	Ponded Area	External Inflow

Prep By	JWM	Date	10/17/13
Rev By	[illegible]	Date	10/2?/13
Calc No.	[illegible]	Sheet	12 of 32

		ft	ft	ft²	
Junction 1	JUNCTION	102.03	109.74	0.00	
Junction 2	JUNCTION	78.31	97.57	0.00	
Outlet	OUTFALL	71.16	74.16	0.00	
Central Cell	STORAGE	112.00	128.00	0.00	
East Cell	STORAGE	116.00	131.00	0.00	Yes
Lower Cell	STORAGE	92.00	104.00	0.00	Yes
Middle Cell	STORAGE	106.00	114.00	0.00	
West Cell	STORAGE	102.00	123.00	0.00	Yes

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
Central Pipe	Central Cell	West Cell	CONDUIT	58.0	4.6207	0.0120
East Cell Pipe	East Cell	Central Cell	CONDUIT	44.0	0.5000	0.0110
East Pipe 1	West Cell	Middle Cell	CONDUIT	66.0	0.7424	0.0110
East Pipe 2	West Cell	Middle Cell	CONDUIT	39.0	7.9487	0.0110
East Pipe 3	West Cell	Middle Cell	CONDUIT	66.0	0.5000	0.0110
East Pipe 4	West Cell	Middle Cell	CONDUIT	38.0	11.5526	0.0110
Middle Pipe	Middle Cell	Lower Cell	CONDUIT	49.0	19.7959	0.0150
Middle Riser Pipe	Junction 1	Lower Cell	CONDUIT	66.0	4.0000	0.0120
Outlet Pipe	Junction 2	Outlet	CONDUIT	173.0	4.1329	0.0120
Riser	Lower Cell	Junction 2	ORIFICE			
Riser at Middle Cell	Middle Cell	Junction 1	ORIFICE			

****
Cross Section Summary
****

Link ID	Shape	Depth/ Diameter ft	Width ft	No. of Barrels	Cross Sectional Area ft²	Full Flow Hydraulic Radius ft	Design Flow Capacity cfs
Central Pipe	CIRCULAR	1.50	1.50	2	1.77	0.38	24.46
East Cell Pipe	CIRCULAR	2.00	2.00	1	3.14	0.50	18.90
East Pipe 1	CIRCULAR	0.83	0.83	1	0.55		

0.21	2.23				
East Pipe 2	CIRCULAR	1.00	1.00	1	0.79
0.25	11.87				
East Pipe 3	CIRCULAR	1.50	1.50	1	1.77
0.38	8.78				
East Pipe 4	CIRCULAR	1.50	1.50	1	1.77
0.38	42.19				
Middle Pipe	CIRCULAR	1.50	1.50	1	1.77
0.38	40.50				
Middle Riser Pipe	CIRCULAR	2.25	2.25	1	3.98
0.56	67.10				
Outlet Pipe	CIRCULAR	3.00	3.00	1	7.07
0.75	146.90				

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	81.634	23.864
Surface Runoff	5.865	1.714
Continuity Error (%)	-0.000	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	68.091	22.188
Initial Stored Volume	68.023	22.166
Final Stored Volume	65.822	21.449
Continuity Error (%)	0.000	

Composite Curve Number Computations Report

Subbasin Central Upper Cell

Soil/Surface Description	Area (acres)	Soil Group	CN
-	3.00	-	48.00
-	1.37	-	98.00
Composite Area & Weighted CN	4.37		63.68

Subbasin East Upper

Soil/Surface Description	Area (acres)	Soil Group	CN
-	2.40	-	

48.00		
-	2.30	-
98.00		
Composite Area & Weighted CN	4.70	
72.47		

Subbasin Lower

Soil/Surface Description CN	Area (acres)	Soil Group
-	11.92	-
48.00		
Composite Area & Weighted CN	11.92	
48.00		

Subbasin Middle

Soil/Surface Description CN	Area (acres)	Soil Group
-	7.22	-
48.00		
-	5.68	-
98.00		
Composite Area & Weighted CN	12.90	
70.02		

Subbasin West Upper Cell

Soil/Surface Description CN	Area (acres)	Soil Group
-	5.48	-
48.00		
-	1.68	-
98.00		
Composite Area & Weighted CN	7.16	
59.73		

****
Subbasin Runoff Summary
****

Subbasin ID	Total Precip in	Total Runoff in	Peak Runoff cfs	Weighted Curve Number	Time of Concentration days	hh:mm:ss
Central Upper Cell	23.50	17.82	76.37	63.680	0	00:06:00
East Upper	23.50	19.48	87.00	72.470	0	00:06:00

Plant Scholz Half PMP Option 1

Lower	23.50	14.15	172.63	48.000	0	00:06:00
Middle	23.50	19.04	235.75	70.020	0	00:06:00
West Upper Cell	23.50	16.98	120.77	59.730	0	00:06:00

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
Junction 1	0.85	1.07	103.10	0	13:16	0	0	0:00:00
Junction 2	0.98	1.18	79.49	0	17:47	0	0	0:00:00
Outlet	0.98	1.18	72.34	0	17:47	0	0	0:00:00
Central Cell	12.66	13.61	125.61	0	13:06	0	0	0:00:00
East Cell	9.76	11.97	127.97	0	00:00	0	0	0:00:00
Lower Cell	7.80	9.55	101.55	0	17:47	0	0	0:00:00
Middle Cell	5.59	7.73	113.73	0	13:16	0	0	0:00:00
West Cell	18.57	20.10	122.10	0	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days hh:mm
Junction 1	JUNCTION	0.00	30.91	0	13:16	0.00	
Junction 2	JUNCTION	0.00	48.23	0	17:47	0.00	
Outlet	OUTFALL	0.00	48.23	0	17:47	0.00	
Central Cell	STORAGE	75.50	88.56	0	12:10	0.00	
East Cell	STORAGE	88.09	88.09	0	12:10	0.00	

Plant Scholz Half PMP Option 1

Lower Cell	STORAGE	168.90	235.07	0	12:10	0.00
Middle Cell	STORAGE	233.71	276.03	0	12:10	0.00
West Cell	STORAGE	121.01	146.91	0	12:10	0.00

****
Storage Node Summary
****

Storage Node	Maximum Outflow cfs	Maximum Exfiltration Rate cfm	Maximum Ponded Exfiltration Volume 1000 ft³	Maximum Ponded Exfiltration Rate (%)	Time of Max. Ponded Volume days hh:mm:ss	Total Exfiltrated Volume 1000 ft³	Average Ponded Volume 1000 ft³	Average Ponded Volume (%)
Central Cell	26.47	0.00	540.216	61	0 0:00:00	13:06	450.080	51
East Cell	18.90	0.00	1195.107	72	0 0:00:00	00:00	836.521	51
Lower Cell	48.23	0.00	1192.810	52	0 0:00:00	17:46	562.521	24
Middle Cell	71.41	0.00	596.206	93	0 0:00:00	13:15	276.586	43
West Cell	57.72	0.00	1159.063	87	0 0:00:00	00:00	890.339	67

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
Outlet	100.00	34.33	48.23
System	100.00	34.33	48.23

****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity ft/sec	Length Factor Attained	Peak Flow during Analysis cfs	Design Flow Capacity	Ratio of Maximum /Design Flow	Ratio of Reported Condition Surcharged

cfs	Flow	Depth		minutes				
Central Pipe			CONDUIT	0	15:35	14.11	1.00	26.47
48.92	0.54	0.52		0	Calculated			
East Cell Pipe			CONDUIT	0	04:18	6.89	1.00	19.84
18.90	1.05	1.00		1	SURCHARGED			
East Pipe 1			CONDUIT	0	00:01	4.09	1.00	2.23
2.23	1.00	1.00		1440	SURCHARGED			
East Pipe 2			CONDUIT	0	00:01	14.68	1.00	4.74
11.87	0.40	0.43		0	Calculated			
East Pipe 3			CONDUIT	0	00:01	4.97	1.00	8.78
8.78	1.00	1.00		1440	SURCHARGED			
East Pipe 4			CONDUIT	0	00:55	27.25	1.00	44.28
42.19	1.05	1.00		0	> CAPACITY			
Middle Pipe			CONDUIT	0	12:06	26.21	1.00	42.67
40.50	1.05	1.00		0	SURCHARGED			
Middle Riser Pipe			CONDUIT	0	13:16	16.53	1.00	30.91
67.10	0.46	0.48		0	Calculated			
Outlet Pipe			CONDUIT	0	17:47	18.61	1.00	48.23
146.90	0.33	0.39		0	Calculated			
Riser			ORIFICE	0	17:47			48.23
Riser at Middle Cell			ORIFICE	0	13:16			30.91

****
Highest Flow Instability Indexes
****
Link East Pipe 4 (7)
Link Middle Pipe (5)
Link Central Pipe (3)
Link East Cell Pipe (2)

WARNING 107 : Initial water surface elevation defined for Junction Junction 1 is below junction invert elevation.
Assumed initial water surface elevation equal to invert elevation.
WARNING 108 : Surcharge elevation defined for Junction Junction 1 is below junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.
WARNING 107 : Initial water surface elevation defined for Junction Junction 2 is below junction invert elevation.
Assumed initial water surface elevation equal to invert elevation.
WARNING 108 : Surcharge elevation defined for Junction Junction 2 is below junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.

Analysis began on: Thu Oct 17 11:01:45 2013
Analysis ended on: Thu Oct 17 11:01:46 2013
Total elapsed time: 00:00:01

Prep By	JWM	Date	10/17/13
Rev By	FRM	Date	10/20/13
Calc No.		Sheet	16 of 32

DE FP-FRSIS12-01

Minor, Jim

From: Markey, Richard M.
Sent: Tuesday, October 08, 2013 6:49 PM
To: Minor, Jim
Cc: Mendenhall, Kevin; Bryan, Ronald C.; Pegues, James C.
Subject: Re: Plant Scholz

In hearing from Jim Pegues, we need to run 1/2 the PMP.

Thanks

Mike Markey

Sent from my iPhone

On Oct 8, 2013, at 4:44 PM, "Minor, Jim" <JWMINOR@southernco.com> wrote:

> **Attorney-Client Communication Privileged and Confidential; Attorney Work Product**
>
> Mark,
> I wanted to make sure I understood exactly what is needed for the analysis on Scholz. Jim (Pegues) and I discussed the rainfall event and I read through the EPA Assessment. It mentions on page 1-3 to "Determine the PMP to complete the technical documentation". Jim recommended using the ½ PMP to develop the peak flow.
>
> We can use the PMP(probable maximum precipitation) value of 47.1" to do a calculation for the capacity in the ponds. Just for clarification...this is different than a "PMF" (probable maximum flood) analysis. A PMF analysis would be a lot more in depth.
>
> Can you please clarify exactly what is needed? Also, if we only need to provide you with the ½ PMP analysis, we would be able to complete this and have it checked by 10/18/13 or sooner.
>
> Thanks,
>
> **Jim Minor, PE**
> Southern Company Generation
> Engineering and Construction Services
> 42 Inverness Center Parkway Bin 453
> Birmingham, AL 35242
> 205-992-5368 (o)
> 205-288-9566 (c)
> 205-992-5884 (f)
> 15*1494 (Southern Linc)

Prep By JWM	Date 10/17/13
Rev By PMB	Date 10/2013
Calc No	Sheet 9 of 32

12-PP-FF3852-101

Minor, Jim

From: Gallagher, Benjamin J.
Sent: Tuesday, October 15, 2013 10:30 AM
To: Minor, Jim
Subject: FW: Plant Scholz

I am working on updating our stability analysis. I could use the max storm water elevations in pond 1 (the upper cell) and pond 5 (the bottom cell). Please let me know when you will have elevations available. Thanks!

Ben Gallagher, P.E.
Southern Company - Earth Science and Environmental Engineering

---

From: Pegues, James C.
Sent: Tuesday, October 08, 2013 4:48 PM
To: Markey, Richard M.
Cc: Gallagher, Benjamin J.
Subject: FW: Plant Scholz

Mike:

Jim Minor and I talked about this all afternoon. It is my opinion that the PMP is all we need to run. A PMF analysis is what is generally run when routing runoff from a watershed through an impoundment. As we do not have any runoff that enters the pond (we basically only have what rainfall falls directly on the pond plus process flows), I think a calculation similar to what was done for the 25-yr and 100-yr storm events, using the ½ PMP rainfall event, is all we need.

Jim Pegues

From: Minor, Jim
Sent: Tuesday, October 08, 2013 4:44 PM
To: Markey, Richard M.
Cc: Mendenhall, Kevin; Bryan, Ronald C.; Pegues, James C.
Subject: Plant Scholz

Attorney-Client Communication Privileged and Confidential; Attorney Work Product

Mark,
I wanted to make sure I understood exactly what is needed for the analysis on Scholz. Jim (Pegues) and I discussed the rainfall event and I read through the EPA Assessment. It mentions on page 1-3 to "Determine the PMP to complete the technical documentation". Jim recommended using the ½ PMP to develop the peak flow.

We can use the PMP(probable maximum precipitation) value of 47.1" to do a calculation for the capacity in the ponds. Just for clarification...this is different than a "PMF" (probable maximum flood) analysis. A PMF analysis would be a lot more in depth.

Can you please clarify exactly what is needed? Also, if we only need to provide you with the ½ PMP analysis, we would be able to complete this and have it checked by 10/18/13 or sooner.

Thanks,

Jim Minor, PE

Southern Company Generation
Engineering and Construction Services
42 Inverness Center Parkway Bin 453
Birmingham, AL 35242
205-992-5368 (o)
205-288-9566 (c)
205-992-5884 (f)
15*1494 (Southern Linc)

Prep By JWM	Date 10/7/13
Rev By [illegible]	Date 10/2013
Calc No. [illegible]	Sheet 20 of 32

SOUTHERN COMPANY

Design Calculations

Project	Prepared By	Date
PLANT SCHERER	JWM	10/17/13
Subject/Title: ASH POND HYDROLOGIC & HYDRAULIC ANALYSIS	Reviewed By: ~~PNB~~	Date: 10/2013
	Calculation Number: DC-FP-FPC34572-101	Sheet: 21 of 37

CONFIRMATION OF SOFTWARE

AS A CHECK, HYDRAFLOW HYDROGRAPHS WAS USED ON THE EAST UPPER CELL. THE FOLLOWING ASSUMPTIONS WERE USED:

USE ONLY THE EAST POND W/ THE OUTLET PIPE DISCHARGING TO A FREE OUTFALL.

SET THE INVERT OF THE OUTLET PIPE TO EL = 131.00 TO VERIFY THAT POND WILL FILL UP.

USE SAME DATA FOR POND MODEL AS SHOWN IN CALCULATION DC-FP-FPC34572-100.

MAX. HGL IN POND IS 130.18 USING STORMNET.

MAX. HGL IN POND IS 130.06 USING HYDRAFLOW.

SO OK.

SEE SHEETS 22-30 FOR SOFTWARE OUTPUT.

Autodesk® Storm and Sanitary Analysis 2013 - Version 7.1.2186 (Build 1)

****
Project Description
****
File Name ..... Test for East Cell.SPF
Description ..... Plant Scholz
Check against Hydroflow Hydrographs for
East Upper Pond

****
Analysis Options
****
Flow Units ..... cfs
Subbasin Hydrograph Method. SCS TR-55
Time of Concentration..... User-Defined
Link Routing Method ..... Kinematic Wave
Storage Node Exfiltration.. None
Starting Date OCT-17-2013 00:00:00
Ending Date OCT-18-2013 00:00:00
Report Time Step 00:05:00

****
Element Count
****
Number of rain gages 1
Number of subbasins 1
Number of nodes 2
Number of links 1

****
Raingage Summary
****

Gage ID	Data Source	Data Type	Recording Interval min
Design-Storm	1/2 PMP	CUMULATIVE	6.00

****
Subbasin Summary
****

Subbasin ID	Total Area acres
Sub-01	4.70

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow

Prep By JWM	Date 10/17/13
Rev By Pmb	Date 10/2013
Calc No. PL-FP-FPL34522-101	Sheet 23 of 32

Out-01	OUTFALL	0.00	126.25	0.00
EastPond	STORAGE	127.00	131.00	0.00

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
Link-01	EastPond	Out-01	CONDUIT	44.0	15.3409	0.0110

****
Cross Section Summary
****

Link ID	Shape	Depth/ Diameter ft	Width ft	No. of Barrels	Cross Sectional Area ft²	Full Flow Hydraulic Radius ft	Design Flow Capacity cfs
Link-01	CIRCULAR	2.00	2.00	1	3.14	0.50	104.72

************************** Runoff Quantity Continuity **************************	Volume acre-ft	Depth inches
Total Precipitation	9.347	23.864
Surface Runoff	0.761	1.943
Continuity Error (%)	-0.000	

************************** Flow Routing Continuity **************************	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	0.000	0.000
Initial Stored Volume	1.700	0.554
Final Stored Volume	9.308	3.033
Continuity Error (%)	0.000	

****
Composite Curve Number Computations Report
****

Subbasin Sub-01

Area Soil

East Upper Pond Check

Soil/Surface Description	(acres)	Group CN
-	2.40	- 48.00
-	2.30	- 98.00
Composite Area & Weighted CN	4.70	72.47

****
Subbasin Runoff Summary
****

Subbasin ID	Total Precip in	Total Runoff in	Peak Runoff cfs	Weighted Curve Number	Time of Concentration days	hh:mm:ss
Sub-01	23.50	19.48	87.00	72.470	0	00:06:00

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
Out-01	124.25	124.25	124.25	0	00:00	0	0	0:00:00
EastPond	2.00	3.18	130.18	1	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days	hh:mm

East Upper Pond Check

Out-01	OUTFALL	0.00	0.00	0	00:00	0.00
EastPond	STORAGE	86.27	86.27	0	12:10	0.00

****
Storage Node Summary
****

Storage Node ID	Maximum Ponded Volume 1000 ft³	Maximum Exfiltration Rate cfm	Maximum Exfiltration Volume 1000 ft³	Time of Max Ponded Volume (%)	Time of Max. Exfiltrated Volume days hh:mm	Average Ponded Volume 1000 ft³	Average Ponded Volume (%)	Maximum Outflow cfs	Maximum Rate hh:mm:ss	Total Exfiltration Volume 1000 ft³
EastPond	405.461	76	1	00:00	225.249	42	0.00	0.00	0:00:00	0.000

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
Out-01	0.00	0.00	0.00
System	0.00	0.00	0.00

****
Link Flow Summary
****

Link ID	Element Type	Time of Maximum Occurrence days hh:mm	Length Peak Flow Velocity ft/sec	Design Flow cfs	Ratio of Maximum Flow / Design Flow Capacity	Ratio of Maximum Reported Flow Depth	Total Factor During Analysis Surcharged minutes	Time Condition Attained
Link-01	CONDUIT	0 00:00	0.00 1.00	104.72	0.00	0.00	0	Calculated

Prep By JWM	Date 10/17/13
Rev By [illegible]	Date 10/2013
Calc No. DC-FSC-[illegible]	Sheet 26 of 32

****
Highest Flow Instability Indexes
****
All links are stable.

Analysis began on: Thu Oct 17 10:51:35 2013
Analysis ended on: Thu Oct 17 10:51:36 2013
Total elapsed time: 00:00:01

Hydrograph Report

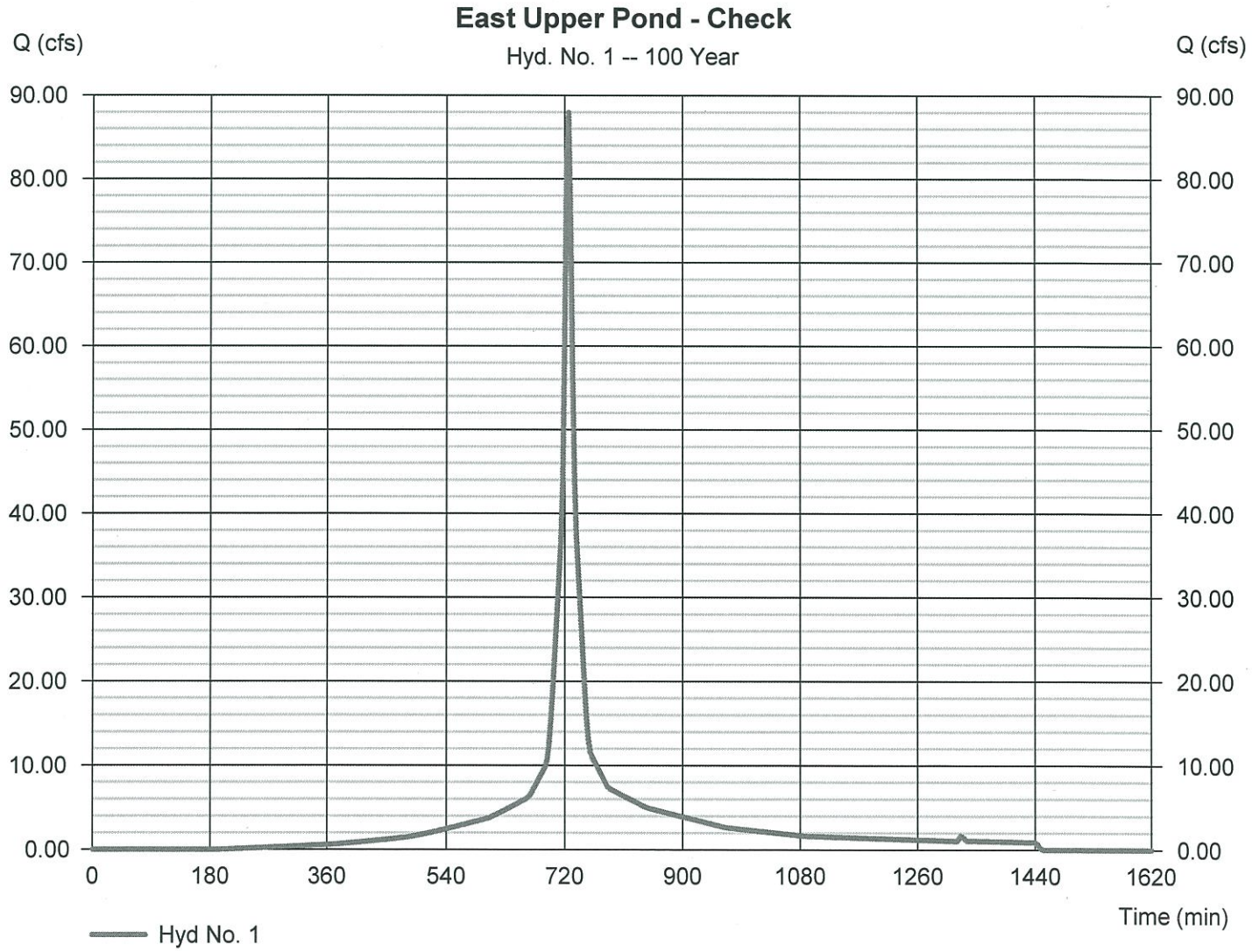
Prep By JWM	Date 10/17/13 1
Rev By	Date 10/2013
Calc No.	Thursday, 10 / 17 / 2013 Sheet 27 of 32

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

Hyd. No. 1

East Upper Pond - Check

Hydrograph type	= SCS Runoff	Peak discharge	= 87.95 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 311,744 cuft
Drainage area	= 4.700 ac	Curve number	= 72.5
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 23.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Prep By	JWM	Date	10/17/13
Rev By	~~TMG~~	Date	10/2013
Calc No.	R-EP-DR3KD-10	Sheet	28 of 32

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

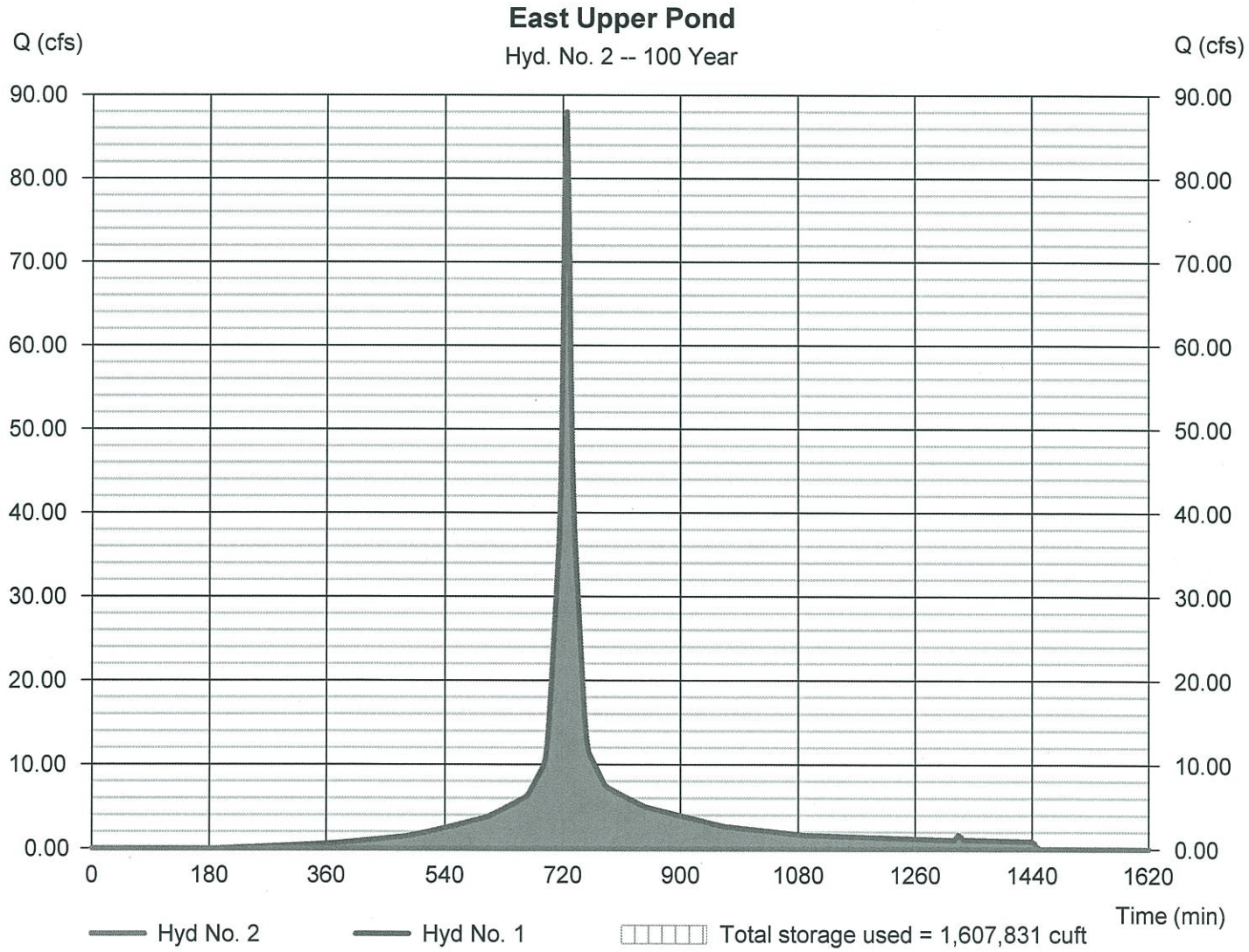
Thursday, 10 / 17 / 2013

Hyd. No. 2

East Upper Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= n/a
Time interval	= 3 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 1 - East Upper Pond - Check	Max. Elevation	= 130.06 ft
Reservoir name	= East Upper Pond	Max. Storage	= 1,607,831 cuft

Storage Indication method used. Wet pond routing start elevation = 128.00 ft.



Pond Report

Pond No. 1 - East Upper Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 116.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	116.00	682	0	0
1.00	117.00	4,137	2,166	2,166
2.00	118.00	141,330	56,543	58,709
3.00	119.00	29,201	78,250	136,959
4.00	120.00	46,383	37,458	174,418
5.00	121.00	106,673	74,458	248,876
6.00	122.00	124,230	115,329	364,204
7.00	123.00	130,766	127,471	491,676
8.00	124.00	167,177	148,584	640,260
9.00	125.00	169,686	168,413	808,673
10.00	126.00	171,697	170,673	979,347
11.00	127.00	156,947	164,250	1,143,597
12.00	128.00	148,105	152,489	1,296,086
13.00	129.00	151,431	149,750	1,445,836
14.00	130.00	154,762	153,078	1,598,914
15.00	131.00	158,183	156,454	1,755,368

Culvert / Orifice Structures

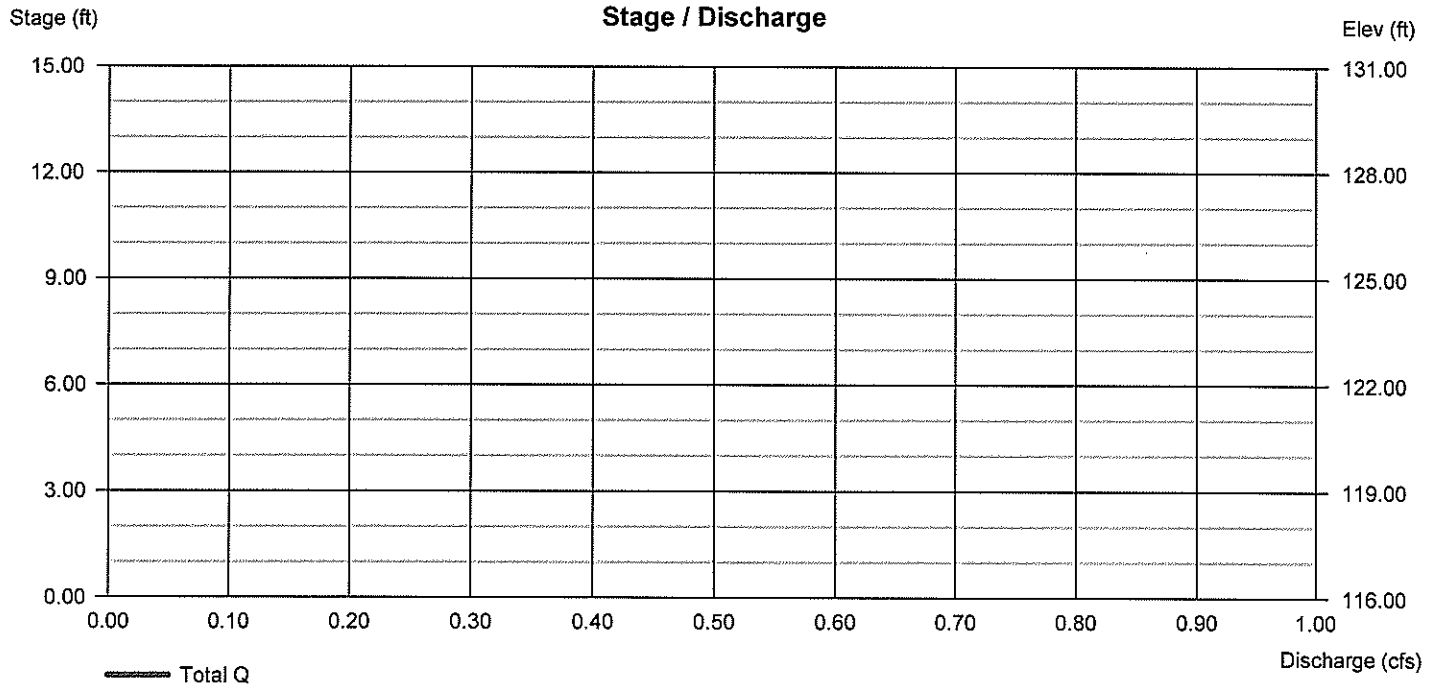
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .000	.000	.000	n/a
Orifice Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	103.6151	17.9000	0.9437	--------
3	0.0000	0.0000	0.0000	--------
5	91.2107	16.7000	0.8635	--------
10	89.1615	16.0000	0.8290	--------
25	91.2380	15.4000	0.7970	--------
50	99.1734	15.5000	0.7905	--------
100	102.9225	15.3000	0.7759	--------

File name: Atlanta_GA FHA.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.40	4.48	3.83	3.36	2.98	2.69	2.45	2.25	2.08	1.94	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.40	5.35	4.61	4.06	3.64	3.30	3.02	2.79	2.59	2.43	2.28	2.15
10	7.15	5.99	5.17	4.57	4.10	3.73	3.42	3.17	2.95	2.77	2.60	2.46
25	8.25	6.93	6.00	5.32	4.78	4.36	4.01	3.72	3.47	3.26	3.07	2.91
50	9.11	7.67	6.65	5.90	5.32	4.85	4.47	4.15	3.87	3.64	3.43	3.25
100	9.95	8.39	7.30	6.48	5.85	5.34	4.92	4.57	4.28	4.02	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Engineering\Fossil and Hydro-West\Sitework__GROUP\Minor Jim\Plant Scholz\Storm Drainage\Scholz PMP.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	5.00	0.00	6.50	7.75	9.00	10.25	23.50
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

HYDROMETEOROLOGICAL REPORT NO. 51

Probable Maximum Precipitation Estimates, United States East of the 105th Meridian

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

Washington, D C
June 1978

Prep By JWM	Date 10/17/13
Rev By ~~TMC~~	Date 10/2013
Calc No. DE-FP-[illegible]	Sheet 32 of 32

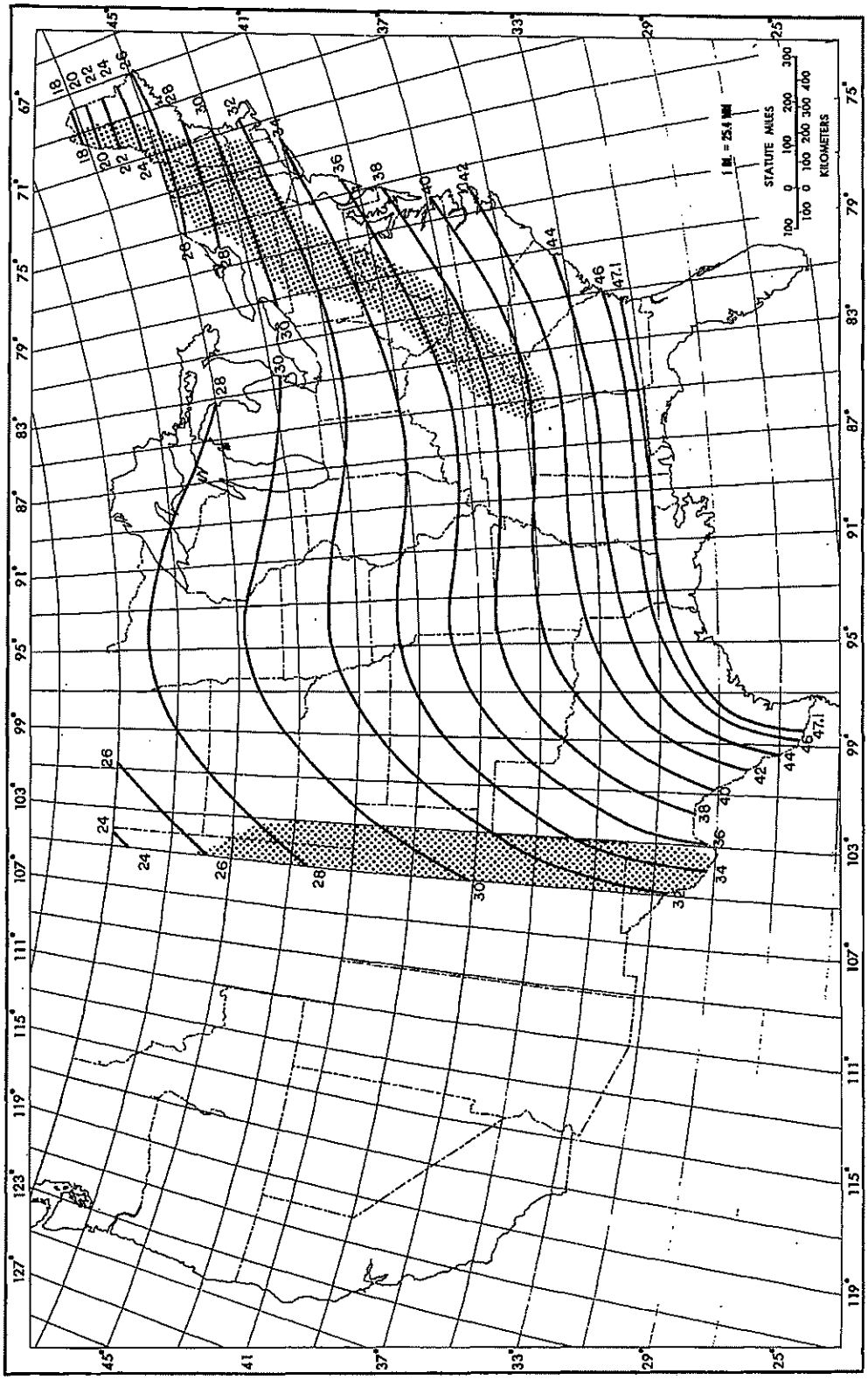


Figure 20.--All-season PMP (in.) for 24 hr 10 mi^2 (26 km^2).

SEQUENTIAL PLAN FOR TREE REMOVAL AND EMBANKMENT IMPROVEMENTS
ASH POND SOUTH DIKE EMBANKMENT
PLANT SCHOLZ
SNEADS, FLORIDA

The Plant Scholz Ash Pond is formed on most sides by perimeter earthen dikes (a portion is incised). The South Dike is constructed atop a natural slope which flattens as it approaches the lowlands south of the pond. As noted in the 2011 and 2012 Ash Dike Inspections performed annually by Southern Company Hydro Services Dam Safety, numerous trees of various sizes and ages are present on the downstream slopes of the South Dike. This "Sequential Plan for Tree Removal and Embankment Improvements" has been developed as a guide for Plant Scholz to utilize in upcoming maintenance activities not only on the South Dike but elsewhere around the pond, as needed.

This guide was developed using recommendations made by Southern Company Hydro Services and FEMA Publication 534 "Technical Manual for Dam Owners", September 2005.

The Hydro Services inspection reports recommend that trees be removed on the South Dike to a distance of about 25 feet down the slope, measured from the downstream crest edge. A distance of 25 feet was selected based on the configuration of the slope, as a distance of 25 feet is expected to extend beyond the toe of the downstream slope embankment fill. Thus, any trees present outside this zone will be located on natural slopes and do not present a concern with regard to embankment stability and integrity.

FEMA Pub. 534 outlines tree and brush removal needs and priorities based on position of trees and bushes along the downstream slope. The FEMA guidelines establish downstream embankment slope "inspection zones" based on the position from the crest and/or toe of the embankment relative to the height of the embankment. The FEMA guidelines also provide specific tree removal and maintenance measures applicable to each "zone". However, the configuration of the South Dike is such that the FEMA guidelines, which have been prepared for higher and longer embankment slopes, are not directly applicable. Therefore, the SCS Hydro Services recommendation of removal of trees 25 feet down from the crest edge will be used.

Sequential Tree Removal and Embankment Improvement Measures

In accordance with the SCS Hydro Services recommendations and the FEMA Pub. 534 guidelines, tree removal and embankment improvement will be phased. Below is a sequential plan for the various tasks needed. As noted, some tasks have already been accomplished.

Year 1 (2012)

Cut and/or remove all brush and undergrowth from the downstream crest to approximately 25-ft down the slope. Cut all trees having a diameter of 6-in or less as near to the ground as possible within this same zone. Stumps and root balls may be left in place, but the stumps shall be sealed with a waterproof sealant to inhibit decay. Remove the one large tree on the upstream slope near the eyewash station at the west end of the South Dike. **COMPLETED IN 2012**

Year 2 (2013)

Remove all large debris that may be present (i.e. inorganic debris such as discarded pipe, concrete, etc.) and existing fallen trees from the downstream slope to approximately 25-ft from the downstream crest. Beginning at the east end of the South Dike and proceeding westward, begin removal of trees larger than 6-in diameter to approximately 10-ft down the slope from the downstream crest. Clearing this zone first will provide open space for removal of trees located further down the slope in future years. Removal of trees having a diameter greater than 6-in will also require removal of stumps and root balls. Soil loosened by the removal of the root ball shall be compacted in place, or shall be excavated to exposed relatively undisturbed embankment soil. The holes shall then be backfilled using clean and organic-free clayey sand (native to the site) and compacted in 6-in lifts using hand-guided mechanical compaction equipment. Backfilling shall continue until backfill grade matches surrounding grade. The backfilled areas shall then be grassed in accordance with the guidelines presented in the Plant Scholz Ash Pond Maintenance Plan. Growth of grasses and brush should continue to be controlled in accordance with the Maintenance Plan.

Year 3 (2014)

Complete all tasks initiated in Year 2 (2013), as needed. Then, beginning at the east end of the South Dike and proceeding westward, begin removal of the remaining trees larger than 6-in diameter between the downstream crest to 25-ft down the slope from the downstream crest. Removal of trees having a diameter greater than 6-in will also require removal of stumps and root balls. Soil loosened by the removal of the root ball shall be compacted in place, or shall be excavated to exposed relatively undisturbed embankment soil. The holes shall then be backfilled using clean and organic-free clayey sand (native to the site) and compacted in 6-in lifts using hand-guided mechanical compaction equipment. Backfilling shall continue until backfill grade matches surrounding grade. The backfilled areas shall then be grassed in accordance with the guidelines presented in the Plant Scholz Ash Pond Maintenance Plan. Growth of grasses and brush should continue to be controlled in accordance with the Maintenance Plan.

Year 4 (2015)

Complete all tasks initiated in Year 3 (2014), as needed. A more uniform, moderate slope will better facilitate embankment maintenance and inspections. Therefore, after removal of the trees has been completed on the downstream slope to approximately 25-ft from the downstream crest, a topographic survey of the embankment should be performed. The survey will be used to develop an embankment improvement plan that may include regrading of the slope, flattening of the slope, etc. Details of the embankment improvement plan will be developed in Year 4 (2015), including the preparation of design and construction drawings, specifications, cost estimates and bid documents.

Year 5 (2016)

Implement the embankment improvement plan in accordance with its plans and specifications.

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number: TV-SZ-FPC33667-002

Project/Plant: Plant Scholz Ash Pond Dikes	**Unit(s):** Units 1-2	**Discipline/Area:** ES&EE
Title/Subject: Slope Stability Analyses of Ash Pond Dikes		
Purpose/Objective: Analyze Slope Stability of Ash Pond Dikes		
System or Equipment Tag Numbers: NA	**Originator:** Benjamin J. Gallagher, P.E.	

Contents

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	BJG/2-9-11		JCP/2-9-11
1	Added South Dike, revised calculation number	JAL/9-10-12		JCP/9-10-12
2	Revised South Dike topo, Updated H&H data	BJG/10-19-11		JCP/10-19-13

Notes:

Rev. 0, issued as Calculation Number TV-SZ-4161AK-001, and Rev. 1 are superseded by this calculation.

Purpose of Calculation

Plant Background

Plant Scholz is coal-fired steam plant which began operations in 1953. A coal combustion residual, ash, is sluiced from the plant to the ash pond. The sluice water, and other water from the plant, passes through multiple water management cells in the ash pond, allowing the ash to settle out and the water to be treated. The ash is periodically removed from the pond and stockpiled dry. The treated water passes through a V-weir and is discharged to the Apalachicola River.

Portions of the pond were constructed at or below natural ground, with most of the pond formed by a dike of compacted fill. The dike was constructed over time by periodically placing lifts of fill to meet storage needs. The original design drawings for the ash pond were not available. However, the design slopes for the compacted dike are believed to be 2.5 horizontal to 1 vertical (2.5H:1V). Actual slopes generally range from 1.5H:1V to 2.9H:1V based on current survey data with some localized steeper sections.

Purpose

The purpose of this calculation is to evaluate the stability of the Ash Pond dikes using state of the art slope stability methods.

Criteria

The State of Florida does not have specific design criteria for earthen dike ash ponds. A commonly referenced document, the US Corps of Engineers Manual EM 1110-2-1902, October 2003, identifies the following criteria for earthen dams:

1. End of Construction Minimum Factor of Safety - 1.3
2. Steady State Seepage Minimum Factor of Safety - 1.5
3. Steady State Seepage with Seismic Loading Minimum Factor of Safety - 1.1
4. Surcharge Water Conditions Minimum Factor of Safety – 1.4
5. Rapid Drawdown (Upstream) Minimum Factor of Safety - 1.3
6. Submerged Toe with Rapid Drawdown Minimum Factor of Safety - 1.3

Analyses

Based on the previously referenced manual EM 110-2-1902, a several cases for slope stability analysis were selected.

End of Construction

The end of construction case is applicable to new facilities where full effective stress strength parameters have not been established, and porewater pressures have not reached long-term steady state conditions. The structures were constructed decades ago and “short-term” construction cases were not applicable.

Steady State Seepage and Steady State Seepage with Seismic Loading
The steady state seepage and seismic loading cases are applicable. The normal operating water level, which varies between water management cells, was used for free water in the pond. Water levels within the dikes were estimated from drilling data and observed equalizer pipes.

Surcharge Water and Upstream Rapid Drawdown
Pond water levels used in the analysis are based on an October 2013 hydrologic and hydraulic analysis of the ponds for a ½ PMP storm event. For the purpose of the downstream slope stability analysis at the East, North, and South dikes, surcharge water was conservatively assumed to reach the interior top of the dike (0-foot freeboard), although the current hydraulic study indicates ½ PMP water levels will leave 3-foot freeboard in Cells 1 and 5.

The interior berm between Cell 1 and 2 crest is at Elev. 132. Drawdown below the normal operating level in Cell 1 (Elev. 129) is prevented by the elevation of the discharge pipe and operational restrictions that limit pumping rates for drawdown below the discharge pipe elevation. On this basis, rapid drawdown was assumed to be possible between the Elev. 132 and Elev. 129.

The normal pool elevation in Cell 5 is at Elev. 98. Rapid drawdown from normal pool to the level of the sluiced ash would only require a drawdown of two feet. However, for the purpose of this analysis we assumed a rapid drawdown condition from the south dike crest at Elev. 104 to the level of the sluiced ash at Elev. 96. This represents the most conservative drawdown case possible for Cell 5.

Submerged Toe with Rapid Drawdown
The dikes are located outside the mapped 100-year floodway, and the downstream rapid drawdown case is not applicable to these dikes.

Summary of Conclusions

The results of the slope stability analyses for the dikes are presented in the following table:

Condition	Referenced Factor of Safety	Calculated Factor of Safety
Ash Pond Cell 1 – East Dike		
Downstream, Steady State	1.5	1.5
Downstream, Seismic	1.1	1.3
Downstream, Surcharge	1.4	1.4
Upstream, Steady State	1.5	1.7
Upstream, Seismic	1.1	1.3
Upstream, Rapid Drawdown	1.3	1.3

Ash Pond Cell 1 – North Dike		
Downstream, Steady State	1.5	1.6
Downstream, Seismic	1.1	1.4
Downstream, Surcharge	1.4	1.5
Upstream, Steady State	1.5	1.8
Upstream, Seismic	1.1	1.2
Upstream, Rapid Drawdown	1.3	1.3
Ash Pond Cell 5 – South Dike		
Downstream, Steady State	1.5	1.5
Downstream, Seismic	1.1	1.2
Downstream, Surcharge	1.4	1.4
Upstream, Steady State	1.5	3.2
Upstream, Seismic	1.1	2.3
Upstream, Rapid Drawdown	1.3	2.5

For the upstream and downstream slopes, computed factors of safety generally meet the criteria listed in the US Corps of Engineers Manual EM 1110-2-1902, October 2003. These stability analyses reflect the modification and cleanup of the interior of the North Dike and exterior of the South Dike completed as a result recommendations submitted to Gulf Power in 2012.

In addition, the stability analyses indicate the upstream (interior) slopes of the pond are subject to shallow sloughing with rapid changes in water level or seismic loads. The shallow depth of sloughing does not represent a hazard to the dike, but will require prompt maintenance attention. Plant personnel should include inspection of the interior slope following major storm or earthquake events and anytime water level in the cell has decreased more than 6 inches over a period of 24 hour or less.

Finally, the flow channel for Cell 1 is periodically located adjacent to the exterior dike. As pond maintenance and dredging allow, the flow channel should be reconfigured by allowing sluiced ash to buildup along the exterior dike, with dredging from the inside, separation dike. A buildup of sluiced ash along the exterior dike will further flatten the slope and further reduce the potential for drawdown-induced sloughing to impact the compacted exterior dike.

Methodology

Slope stability was evaluated using the following methods and software:

GeoStudio 2007 (Version 7.17, Build 4921), Copyright 1991-2010, GEO-SLOPE International, Ltd. (Rev. 0 calculation)

GeoStudio 2007 (Version 7.19, Build 5027), Copyright 1991-2012, GEO-SLOPE International, Ltd. (Rev.1 calculation)

GeoStudio 2012, June 2013 Release (Version 8.11.1.7283), Copyright 1991-2013, GEO-SLOPE International, Ltd. (Rev.2 calculation)

The software was utilized in general accordance with the procedures for analyzing slope stability using software described in *Soil Strength and Slope Stability* (2005) by Duncan and Wright. The Morgenstern-Price method was for all analyses.

Failure circles were searched using the grid and radius and entry and exit methods. The reported stability sections are the result of multiple iterations of searches at each section. The stability analyses generally begin with a search of a general set of criteria encompassing the entire slope and based on experience with stability analyses. These search incorporated software optimization, as described in the next paragraph. The search criteria (grid and radius or entry and exit locations) are then revised to reach a search condition where the critical slip surface indicated has the least, or minimum, factor of safety, and is bounded by slip surfaces with greater factors of safety. These revisions are often accomplished by focusing the search on the area or areas of critical slip surfaces identified during the initial searches. The final search criteria do not necessarily depict the full extend of searched surfaces, because the criteria used in the final search are focused on the area of critical slip surface.

Software optimization of the critical slip surfaces was utilized during the stability evaluation. After the critical slip surface has been identified by a particular search method, the optimization process in GeoStudio converts the identified critical slip surface into a fully-specified surface consisting of a number of connected points. The software makes adjustments to the points of trial surface using proprietary methods. The results of the adjustments guide further iterations, until an end criterion is reached. The final product is a new, fully-specified slip surface, and the factor of safety for this "optimized" surface is provided.

Optimization can assist the analyst in identifying needed modifications to the search criteria and potential non-circular failure conditions. Optimization can enhance the results of a search for non-circular surfaces using the block method due to the crude failure surface evaluated from block criteria. Where the critical surfaces are circular, or nearly circular, optimization does not make the reported factor of safety more reliable. In this study, the reported slip-surfaces include software optimization, unless noted otherwise.

The stability analysis under seismic load was performed using the pseudostatic method and GeoStudio software. Because the pseudostatic method applies the earthquake acceleration as a constant force, unrealistic stability analyses can result if the peak ground acceleration or spectral seismic acceleration is directly applied as the pseudostatic acceleration (K_h). In this calculation, the mapped, site-modified, spectral seismic acceleration was used to calculate the pseudostatic acceleration (K_h) following the procedure described in *Pseudostatic Coefficient for use in Simplified Seismic Slope Stability Evaluation* (2009) by Bray and Travasarou.

The stability analysis under rapid drawdown was performed in GeoStudio using the staged method described by Duncan. This type of analysis incorporates two piezometric surfaces and evaluates both the effective stress and total stress stability.

Design Inputs

The following general inputs were utilized in the stability analyses:

- The 2002 probabilistic earthquake acceleration mapped by the USGS for the vicinity of Plant Scholz is 0.161g for short-period structures on Site Class D soil profile (2% PE/50years). The corresponding pseudostatic acceleration coefficient (K_h) is 0.072g based on an allowable crest displacement of 2 inches using the Bray and Travasarou procedure.
- The cross-section of the Cell 1 dikes was obtained using a April and May 2010 survey for the pond interior, crest of dike, and downstream surface of the dike.
- The cross-section of the Cell 5 dike was obtained using a September 2012 survey for the pond interior, crest of the dike, and a December 2012 survey for the downstream surface of the dike.
- The rapid drawdown case is conservatively assumed saturation to a piezometric steady state level prior to drawdown.

The following soil properties were used in the analyses:

Soil Description	Moist Unit Weight, pcf	Effective Stress Parameters		Total Stress Parameters	
		Cohesion, psf	Phi Angle, °	Cohesion, psf	Phi Angle, °
North and East Dikes					
Sluiced Ash	80	0	27	100	24
Compacted Ash (Dike)	90	0	34	100	28
Sand (Foundation)	125	0	35	500	22
Clay (Foundation)	120	50	28	N/A	N/A
Marl (Foundation)	125	0	38	N/A	N/A
South Dike					
Sluiced Ash	80	0	27	100	24
Dike Fill	120	400	32	600	28
Residual Sandy Clay/Clayey Sand	120	300	22	N/A	N/A
Residual Silty Clay	120	600	20	N/A	N/A
Marl	125	0	38	N/A	N/A

Engineering properties of the ash materials were evaluated based on recent and historical SPT test data (ASTM D 1586), laboratory shear strength tests (ASTM D 4767) from other Gulf Power facilities, and previous experience with ash. The engineering properties of the foundation soils were determined on the basis of recent laboratory tests, recent field SPT data, a compilation of historical field and laboratory data, and previous experience with engineering properties of these soils.

A Mohr-Coulomb, effective stress soil strength model was used for the stability analyses. This model includes friction and cohesion components and is consistent with the approach described in *Soil Strength and Slope Stability*, an up-to-date textbook that addresses the analysis of the stability of dikes constructed from compacted soil.

References

SCS Drawing E-7058, Flue Gas Desulfurization Sludge Ponds (1974)
SCS Drawing E-PS-4038-15, Plant Scholz General Arrangement Site Plan (1975)
SCS Drawing D-PS-4038-16, Boring Locations (unknown)
SCS Drawing D-PS-4038-27, Geological Cross Sections A-A and B-B (unknown)

SCS Drawing D-PS-4038-28, Location of Existing Monitoring and Water Supply Wells (1984)
SCS Drawing D-PS-4038-29, Location of Ground-Water Monitoring Wells (1984)
SCS Drawing D-PS-4038-39, Topographic Map and Boring Locations (1984)
SCS Drawing D-PS-4038-50, Geologic Cross Sections A-A', B-B' and C-C' (1984)
SCS Drawing 2705SCH, Plant Scholz Ash Pond Plan (2002)
SCS Drawing 3813SHZ, Plant Scholz Profile Lines Rev. 2 (2010)

SCS Calculation DC-FP-FPC034572-101, Ash Pond Hydrologic and Hydraulic Study (2013)

Southern Company Services, Boring Logs EDB-1 through EDB-8, NDB-1 through NDB-4, and B-1 through B-5 (2009 and 2010)

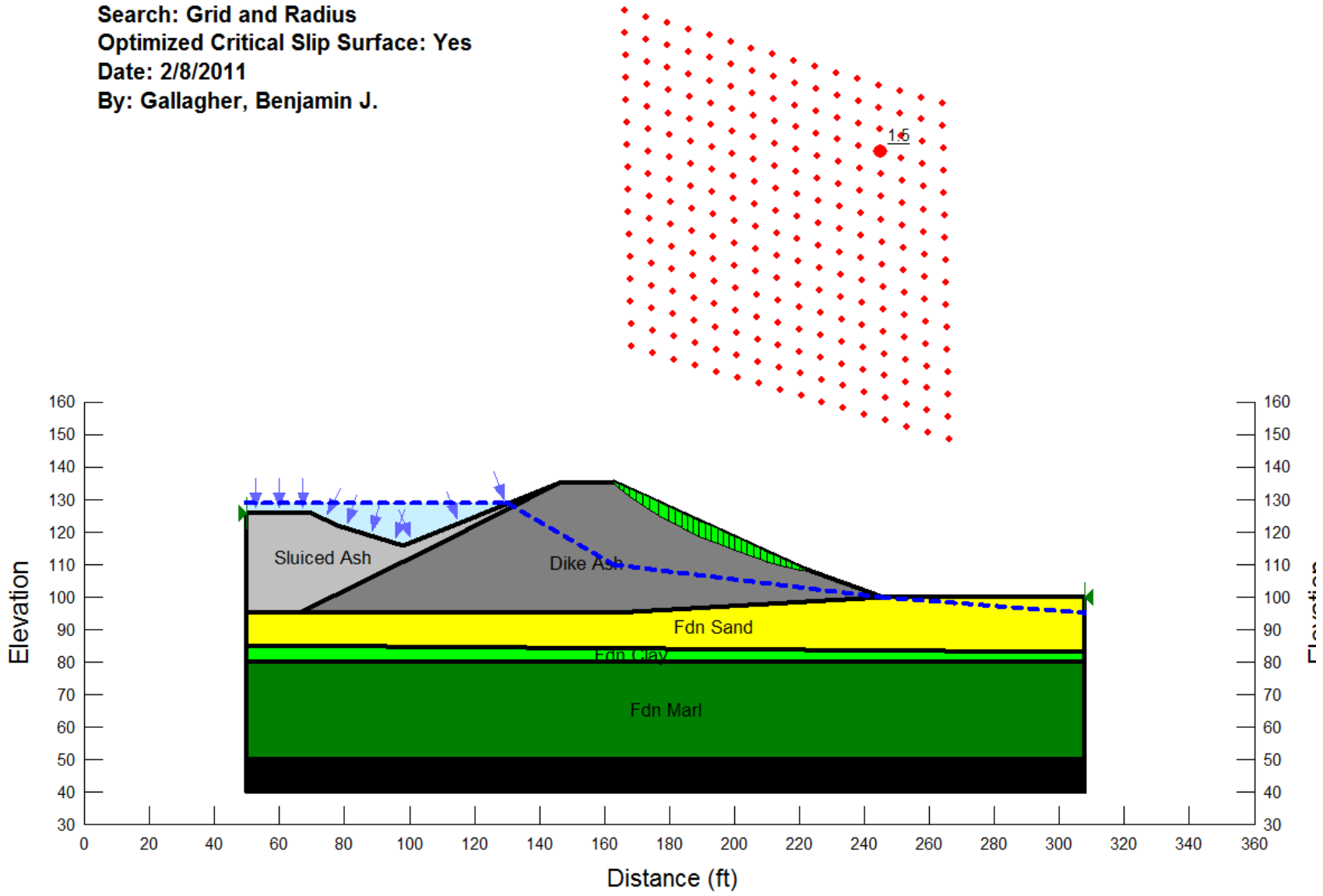
Pittman, Glaze, and Associates, Topographic Survey, Job No. 35298-12, (Dec. 2013)
Pensacola Testing Laboratories Report 55827, *Report of…Lab Test Data* (1981)

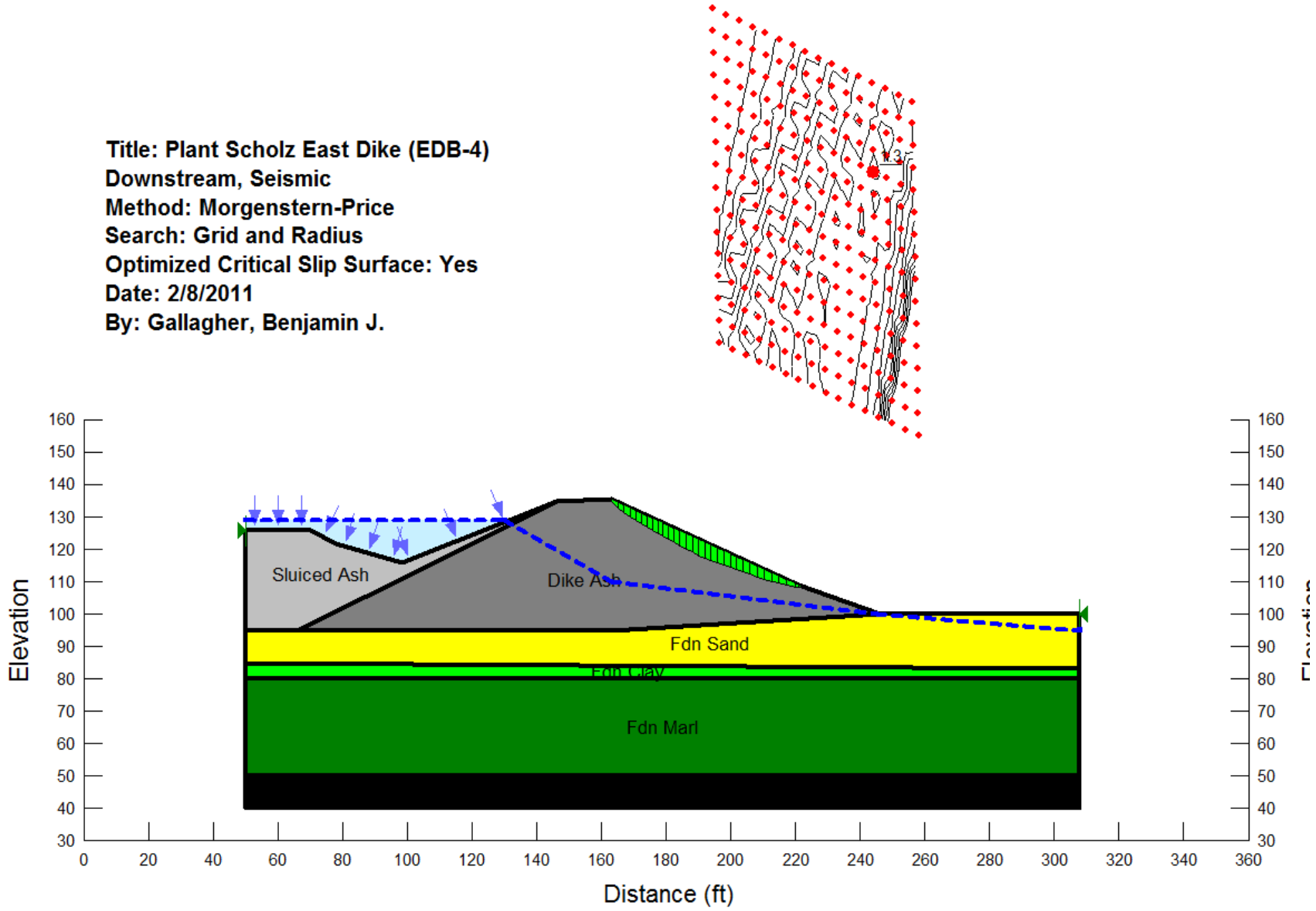
Body of Calculation

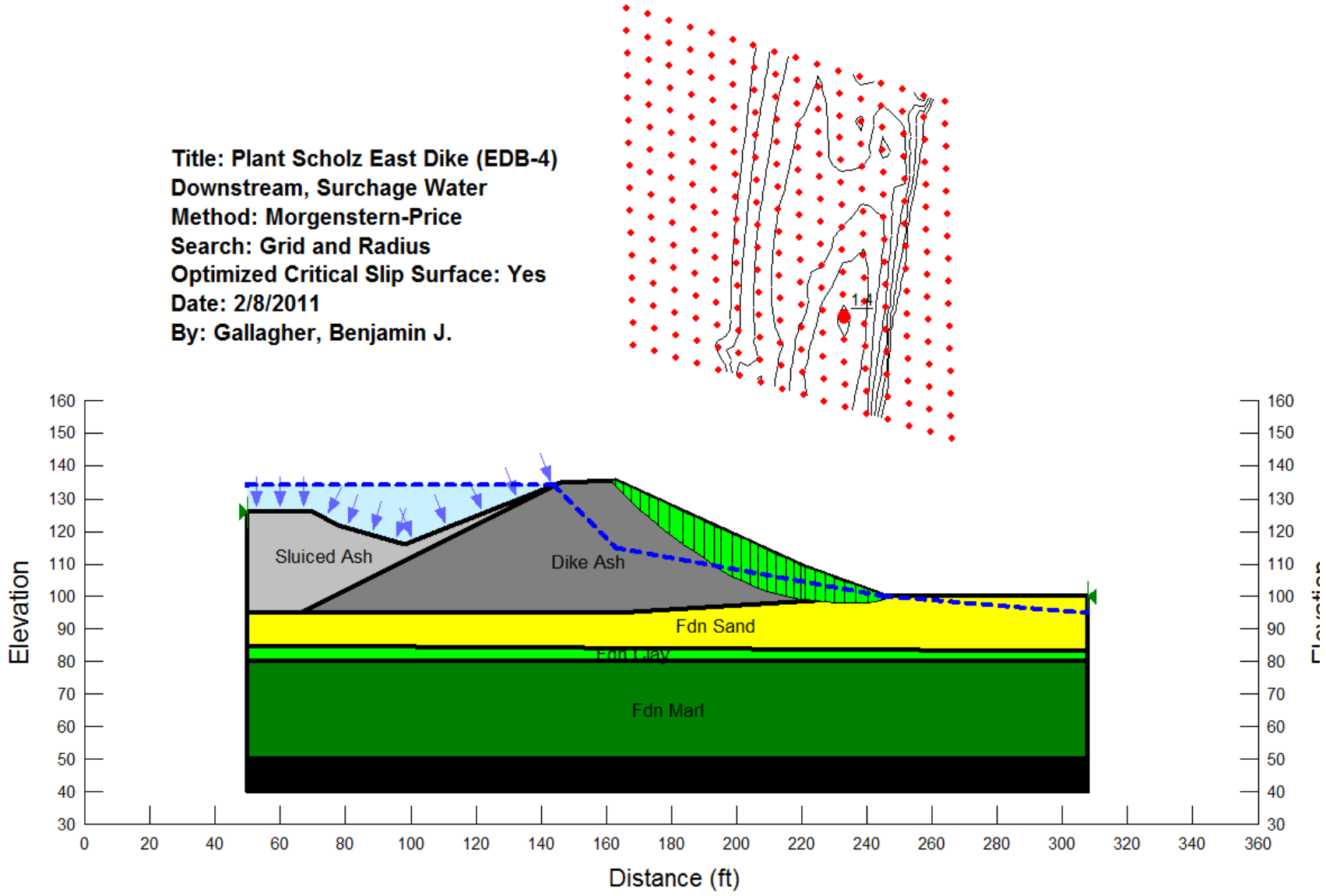
Calculation consists of GeoStudio slope stability runs. Each section and case modeled in GeoStudio is presented with the subsurface stratigraphy, critical slip surface and the minimum factor of safety axis. A supporting data file with slope geometry is also provided for each section.

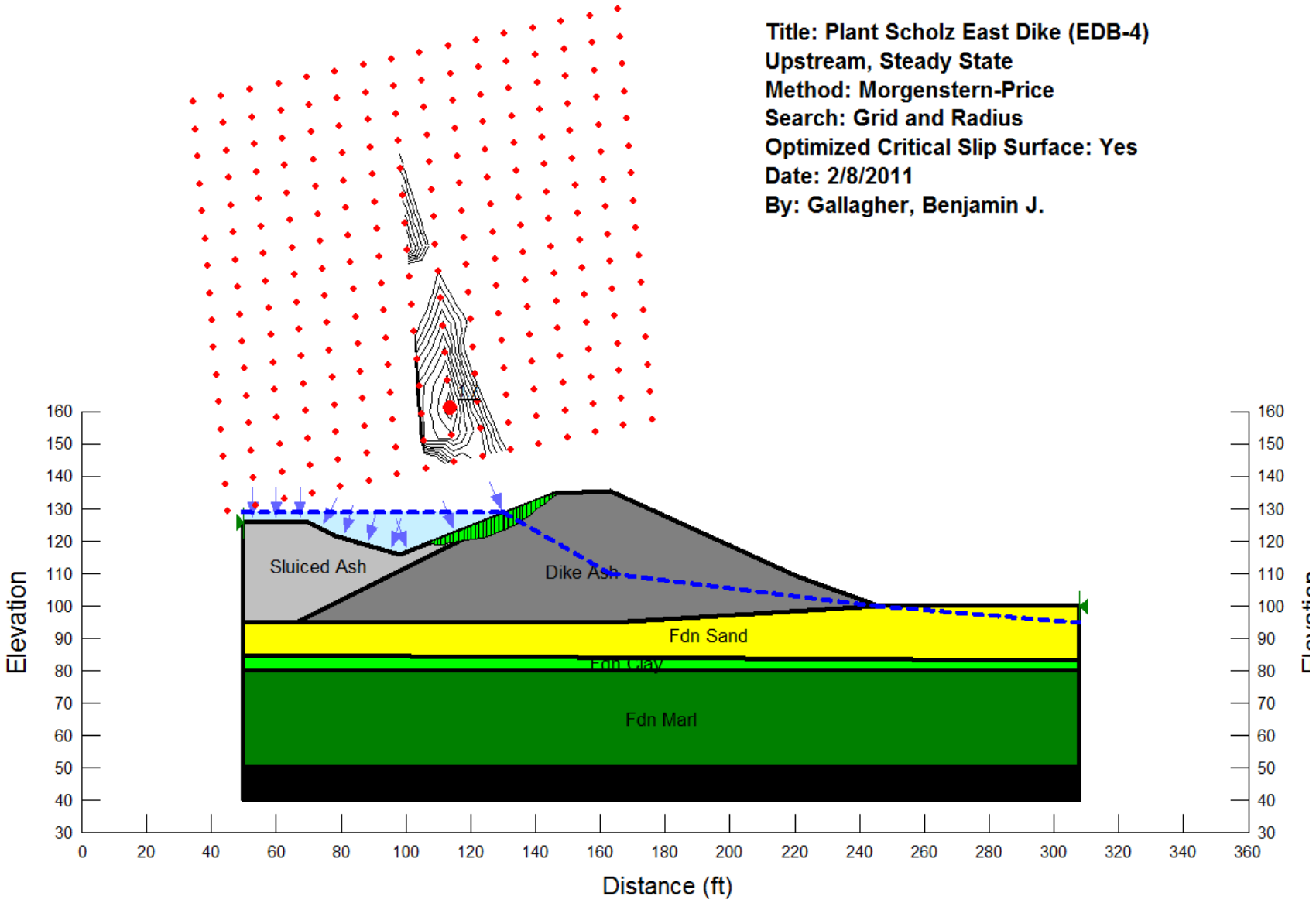
ATTACHMENT A

Title: Plant Scholz East Dike (EDB-4)
Downstream, Steady State
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/8/2011
By: Gallagher, Benjamin J.

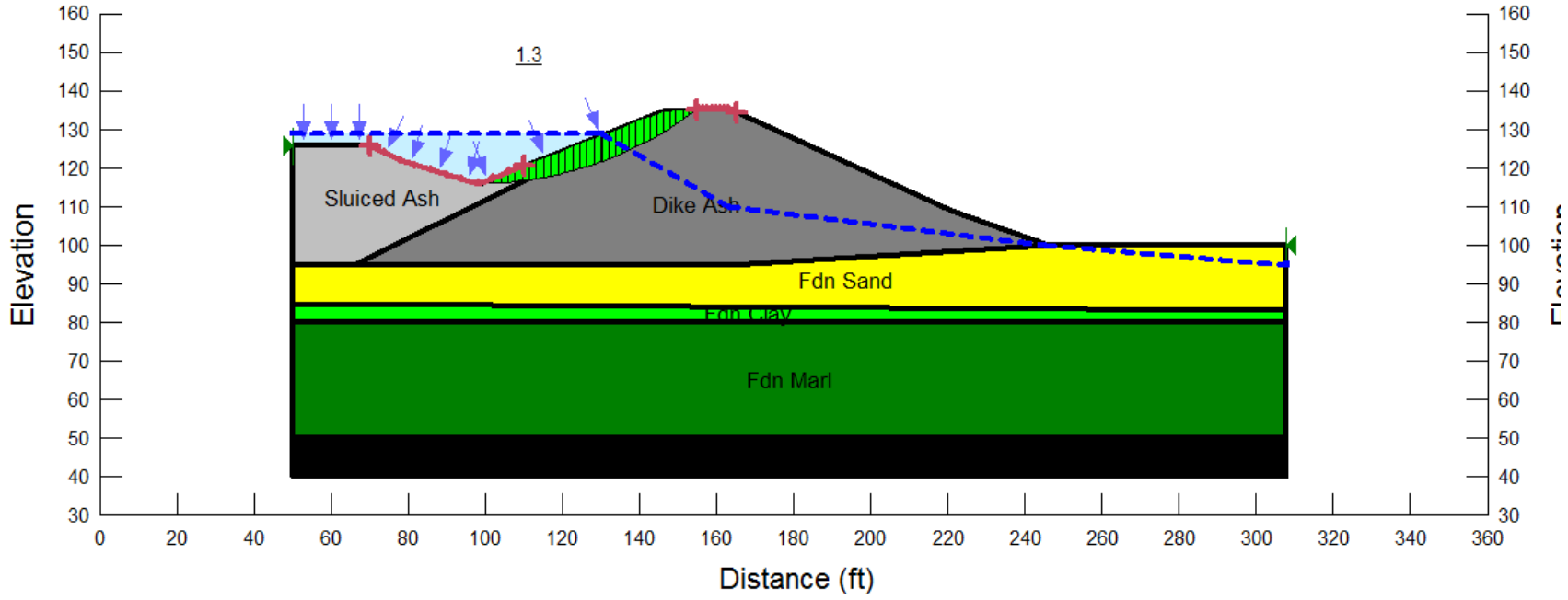




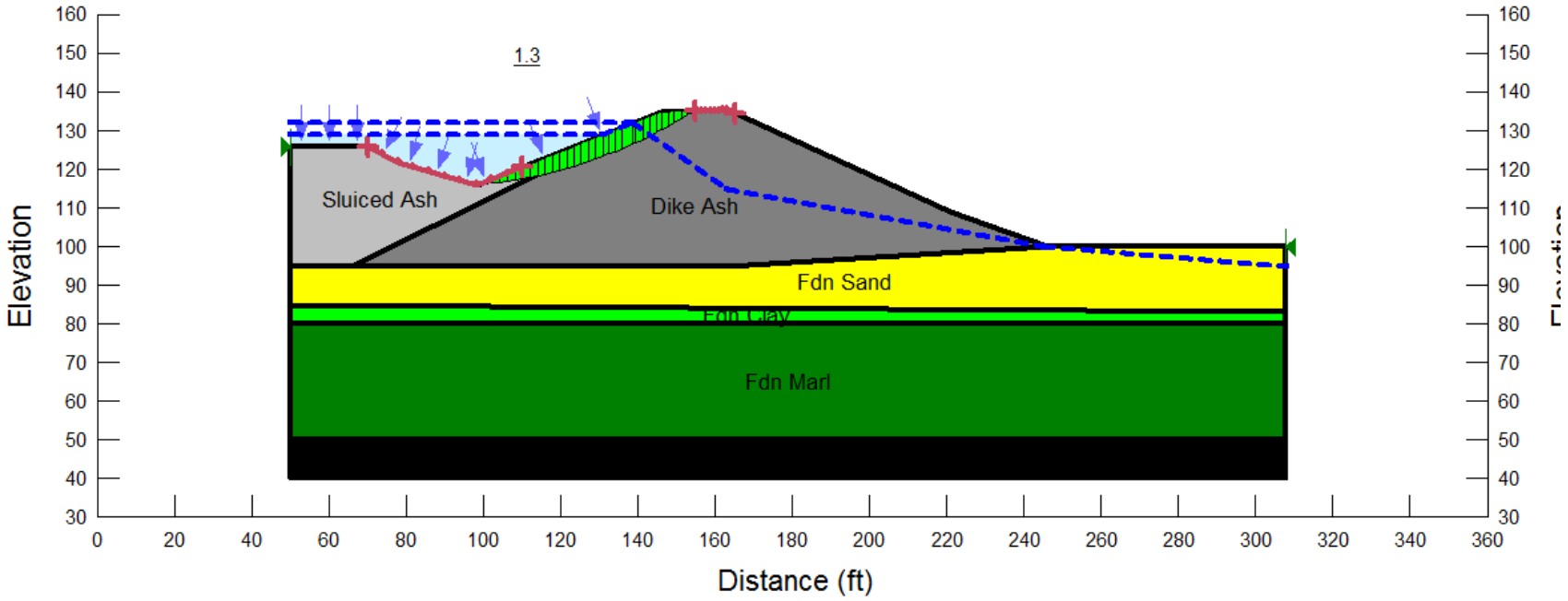




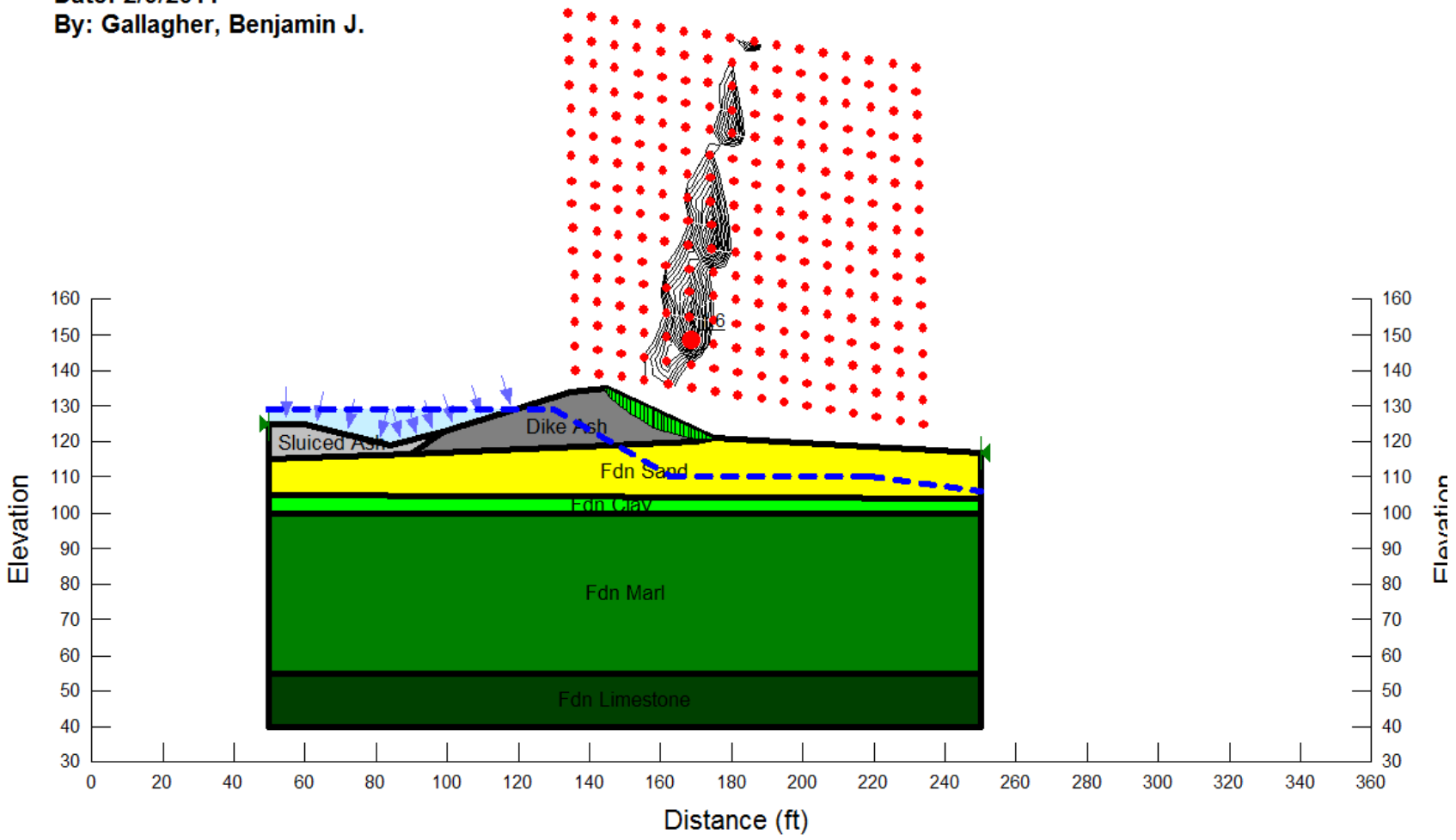
Title: Plant Scholz East Dike
Upstream, Seismic 0.072g (Deep Failure)
Method: Morgenstern-Price
Search: Entry and Exit
Optimized Critical Slip Surface: No
Date: 2/8/2011
By: Gallagher, Benjamin J.



Title: Plant Scholz East Dike
Upstream, Rapid Drawdown (Deep Failure)
Method: Morgenstern-Price
Search: Entry and Exit
Optimized Critical Slip Surface: No
Date: 2/8/2011
By: Gallagher, Benjamin J.



Title: Plant Scholz North Dike Modified (NDB-1)
Downstream, Steady State
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/9/2011
By: Gallagher, Benjamin J.



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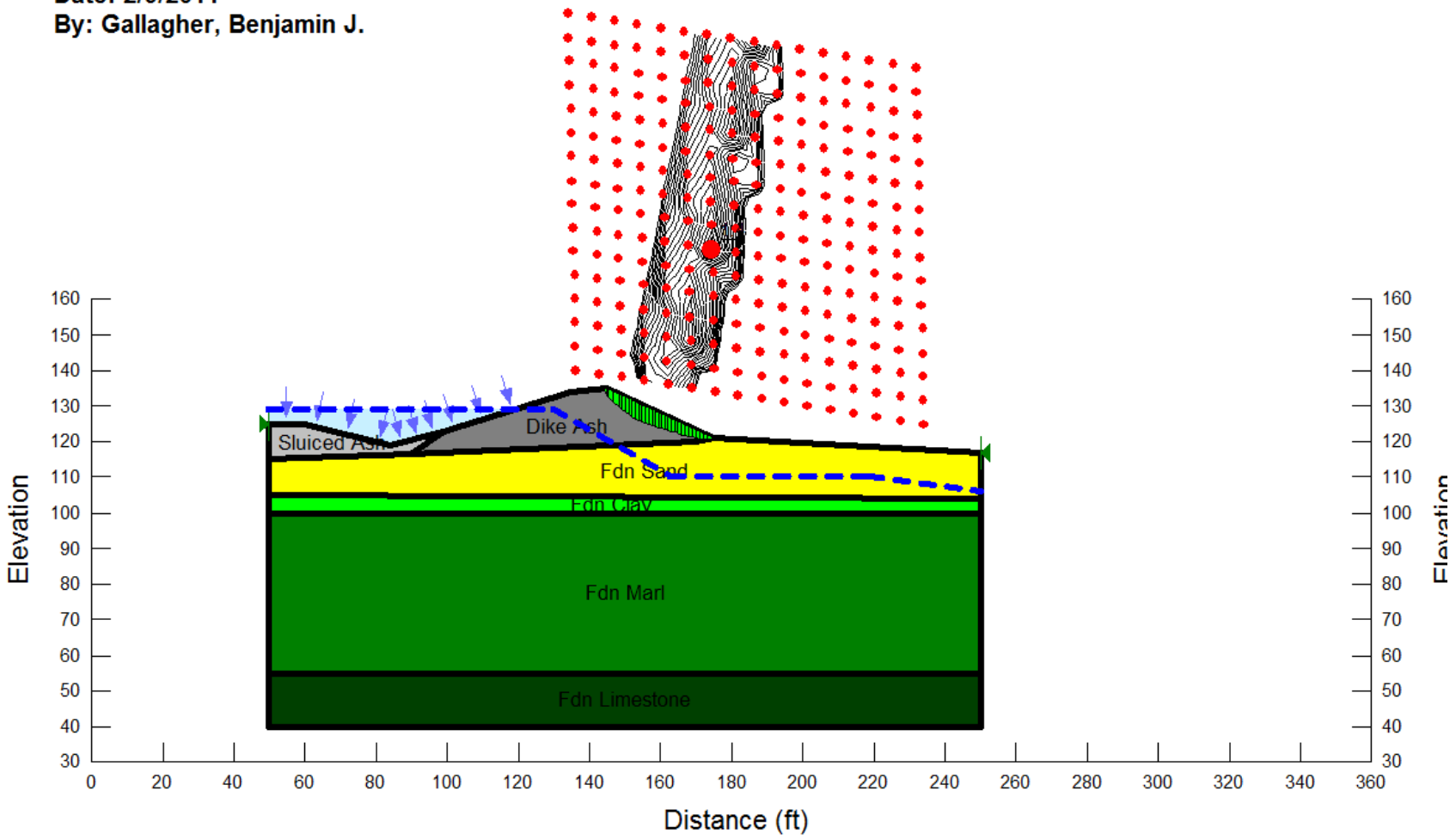
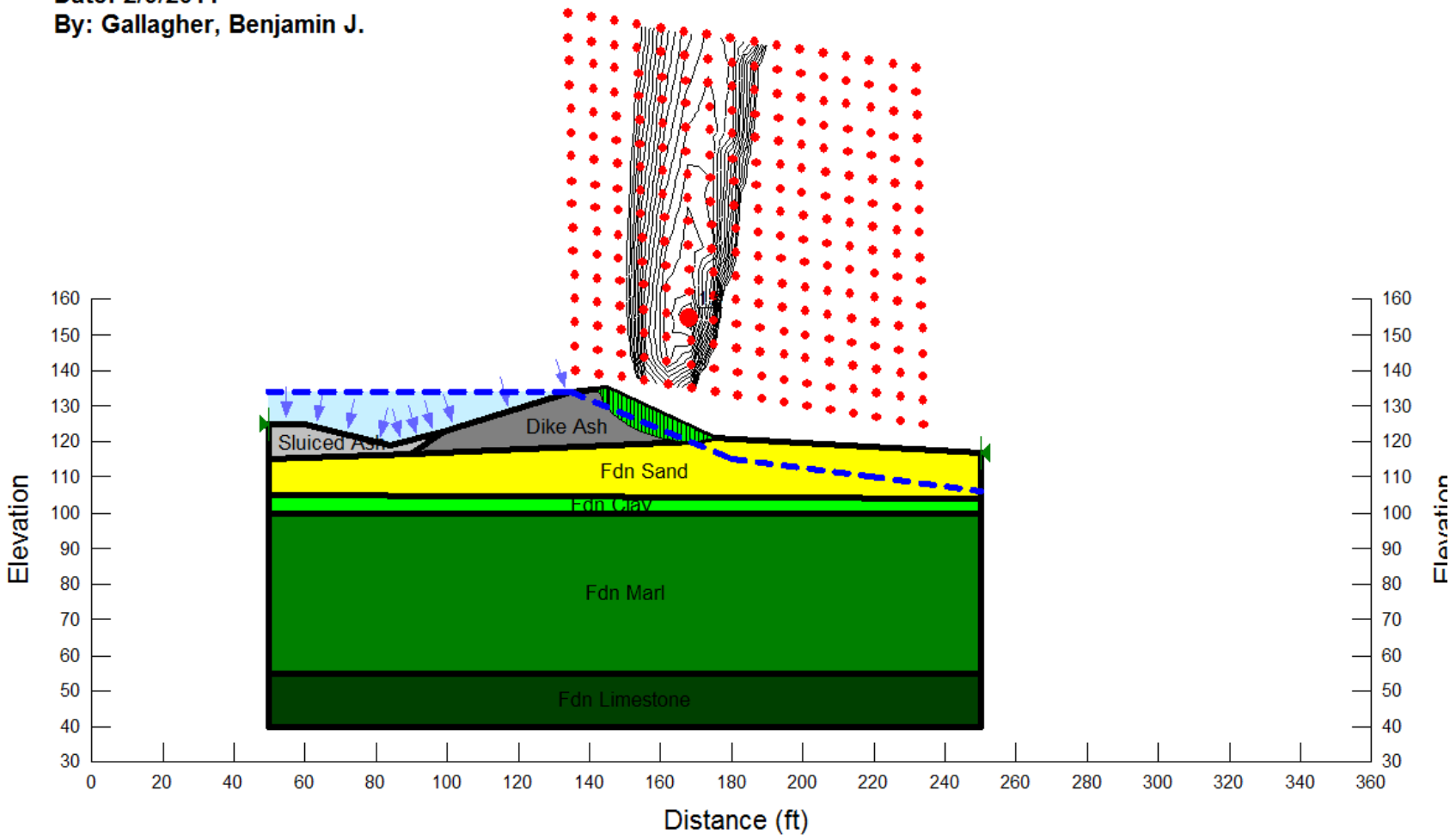
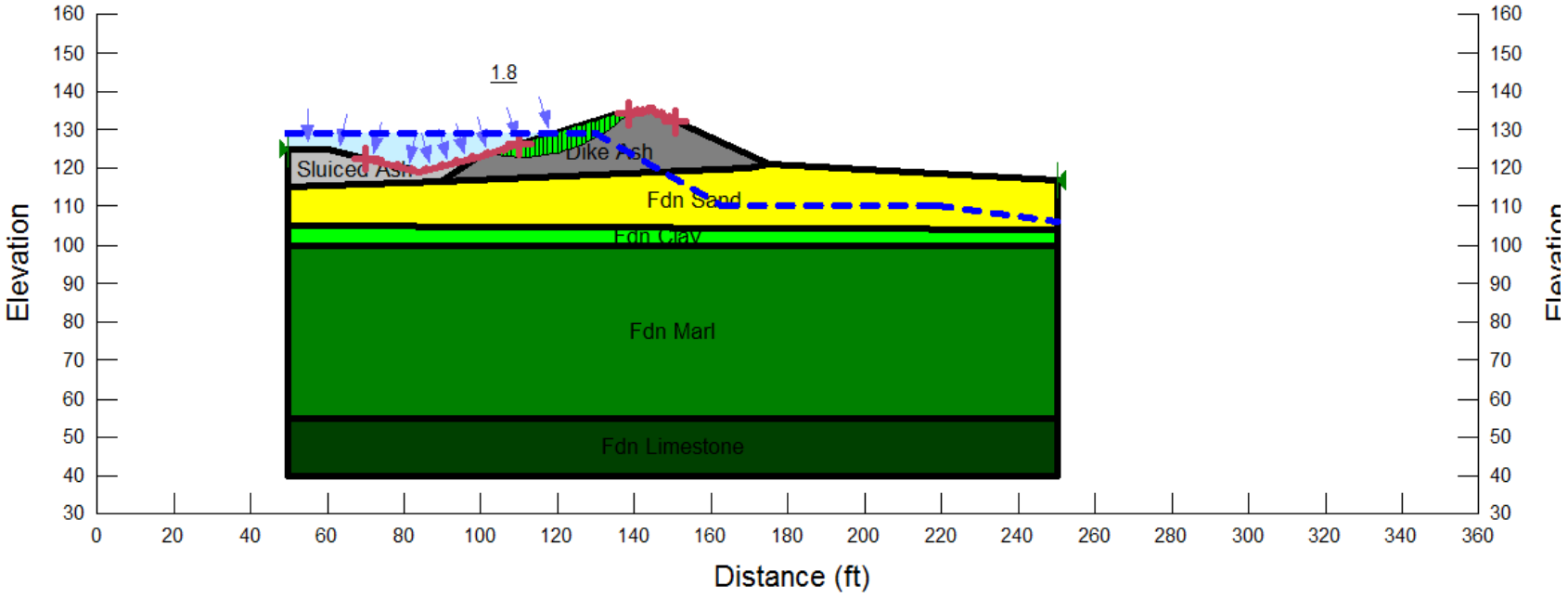
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/9/2011
By: Gallagher, Benjamin J.



Title: Plant Scholz North Dike Modified (NDB-1)
Downstream, Surcharge
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/9/2011
By: Gallagher, Benjamin J.



Title: Plant Scholz North Dike Modified (NDB-1)
Upstream, Steady State (Deep Failure)
Method: Morgenstern-Price
Search: Entry and Exit
Optimized Critical Slip Surface: No
Date: 2/9/2011
By: Gallagher, Benjamin J.



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Upstream, Seismic 0.072g (Deep Failure)
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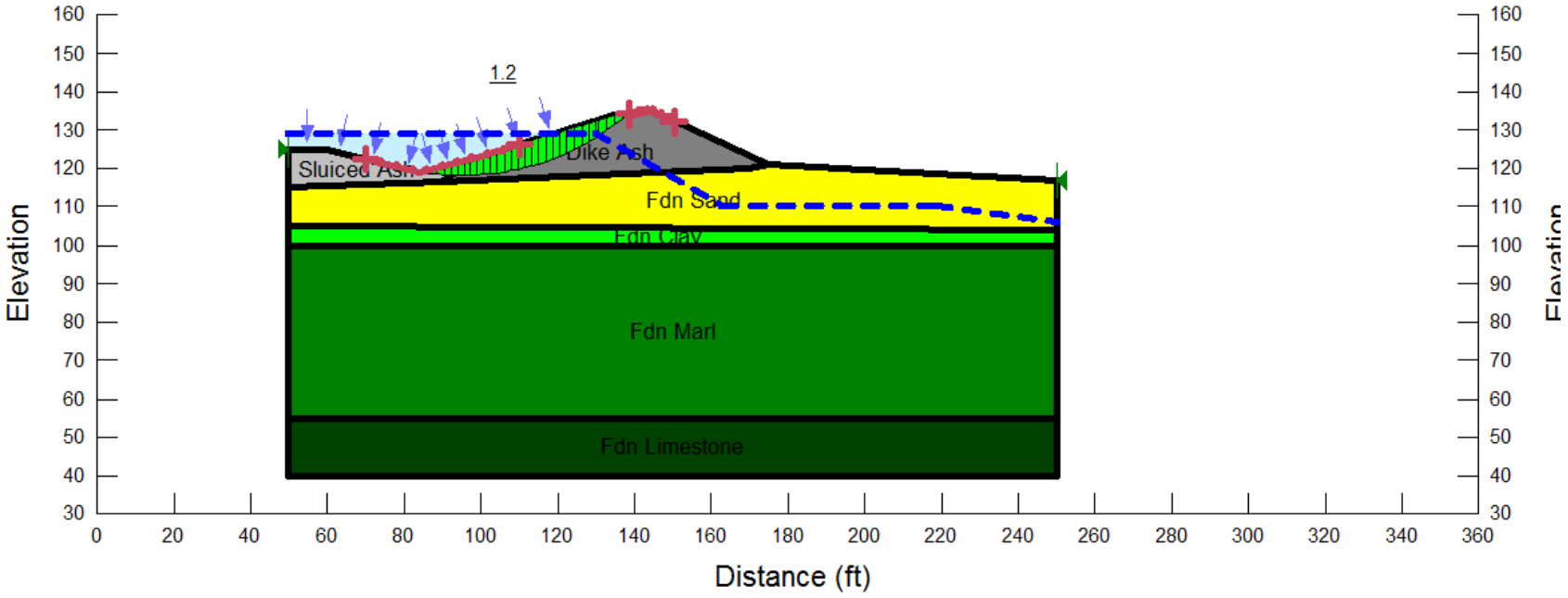
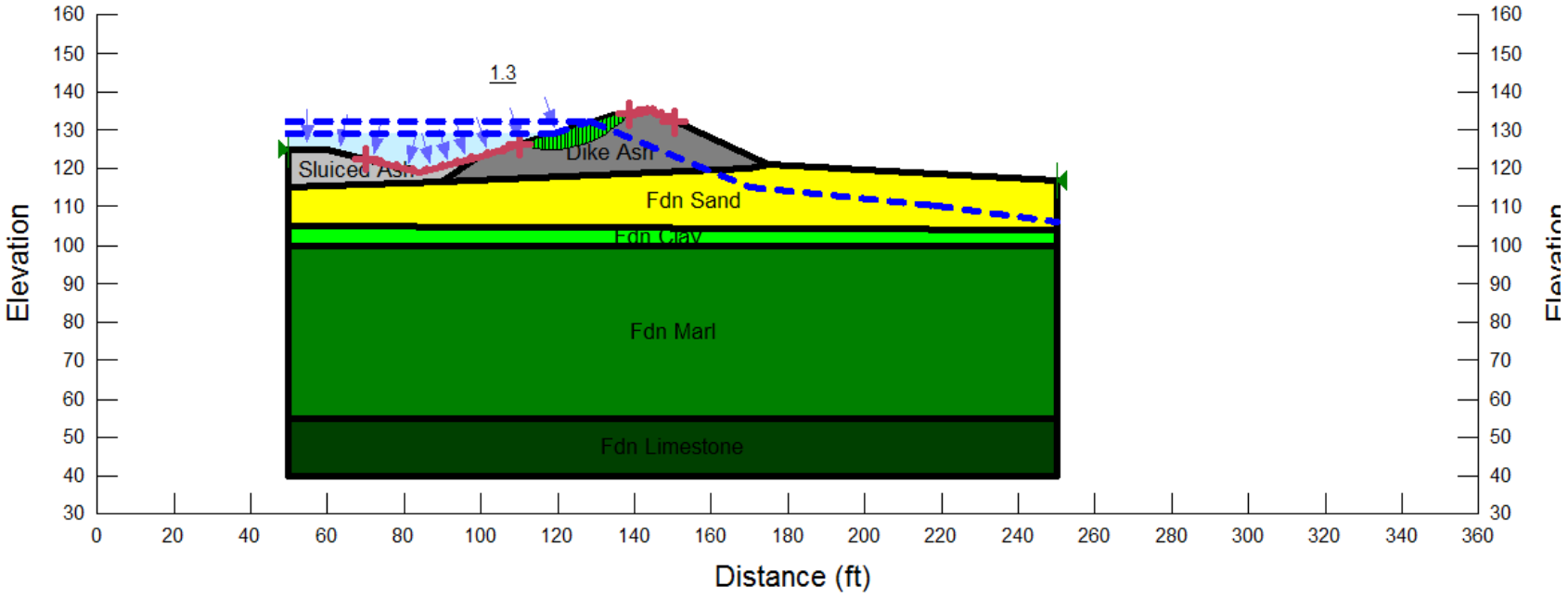
Search: Entry and Exit
Optimized Critical Slip Surface: No
Date: 2/9/2011
By: Gallagher, Benjamin J.



Title: Plant Scholz North Dike Modified (NDB-1)
Upstream, Rapid Drawdown (Deep Failure)
Method: Morgenstern-Price
Search: Entry and Exit
Optimized Critical Slip Surface: No
Date: 2/9/2011
By: Gallagher, Benjamin J.



Title: Plant Scholz South Dike (SD-1)
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Method: Morgenstern-Price
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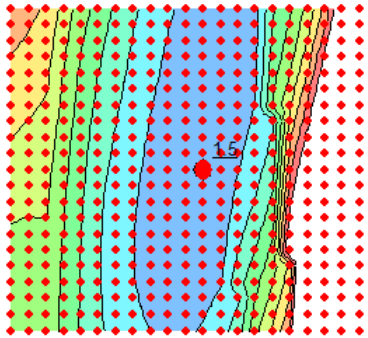
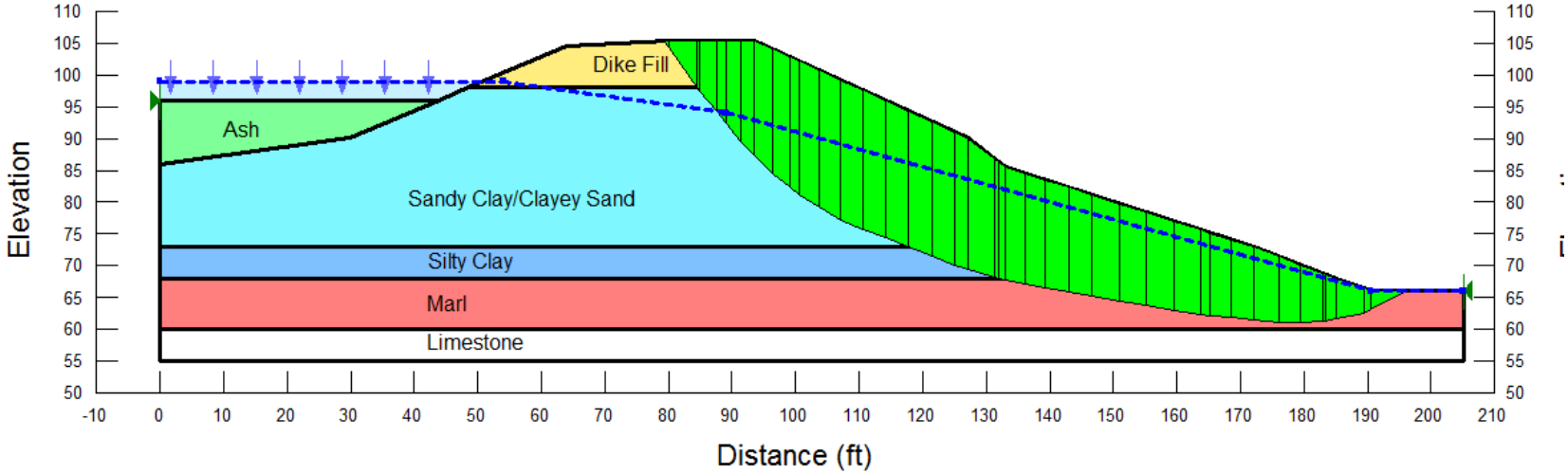
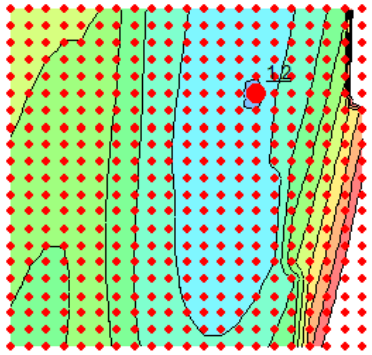
Horz Seismic Load: 0
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013

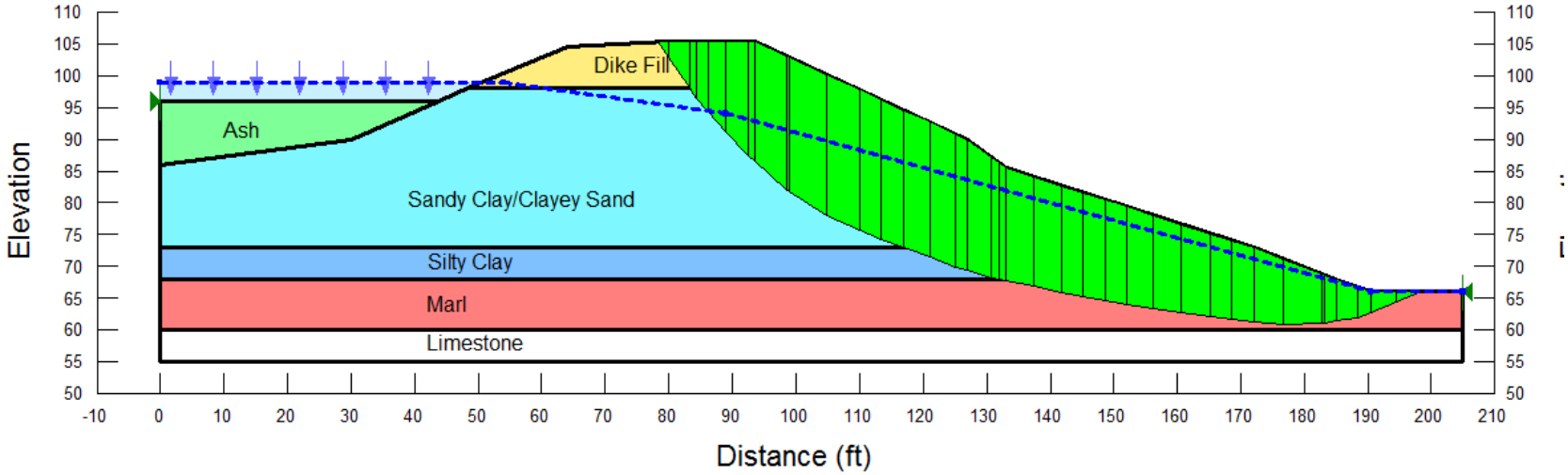




Name: Dike Fill Unit Weight: 120 pcf Cohesion': 400 psf Phi': 32 °
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 °

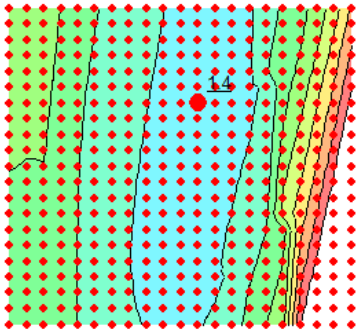
Title: Plant Scholz South Dike (SD-1)
Downstream, Seismic
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0.072
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013

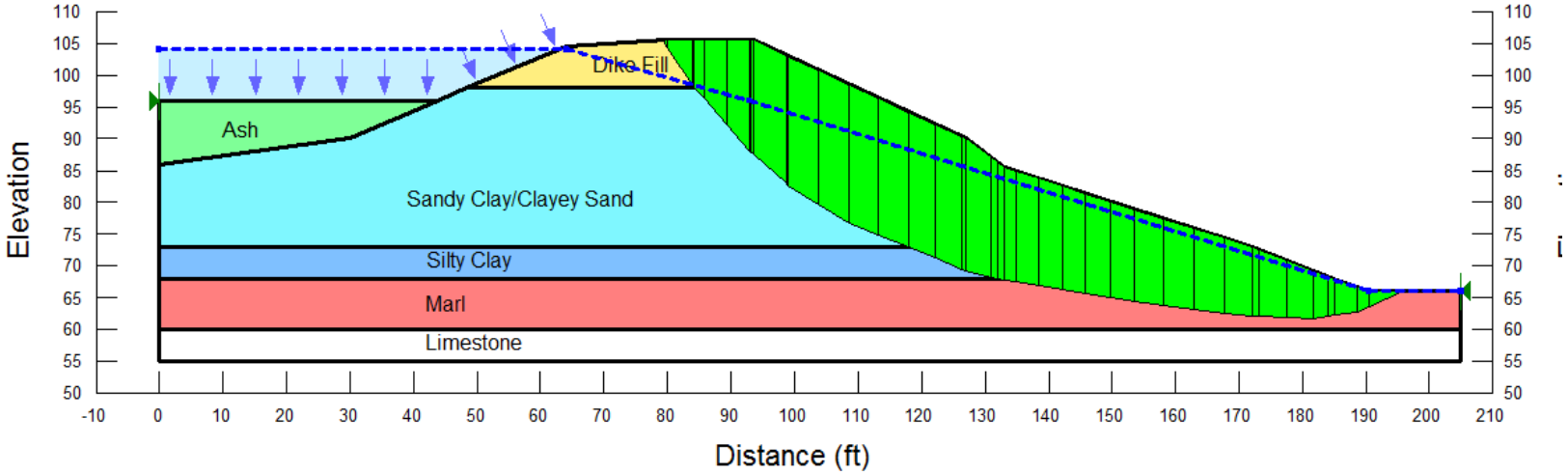




Name: Dike Fill Unit Weight: 120 pcf Cohesion': 400 psf Phi': 32 °
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 °

Title: Plant Scholz South Dike (SD-1)
Downstream, Surcharge
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013





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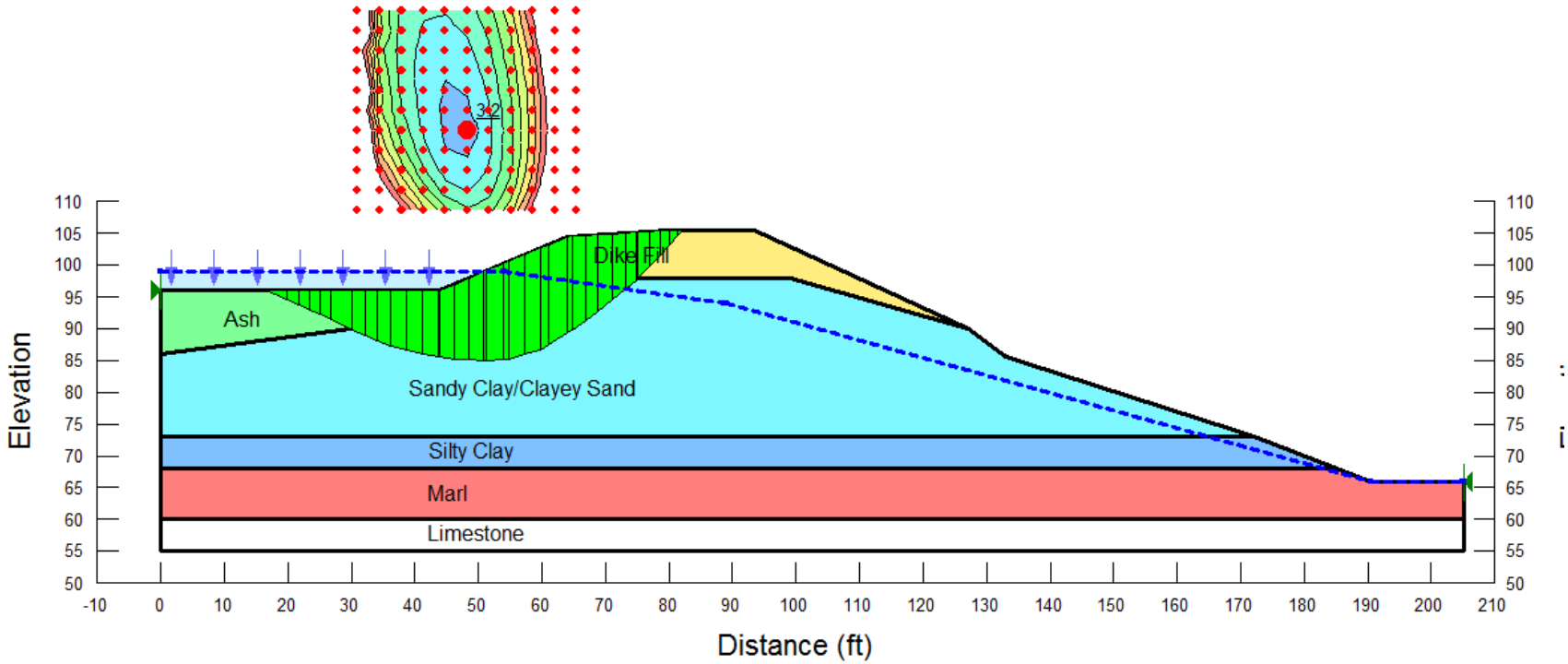
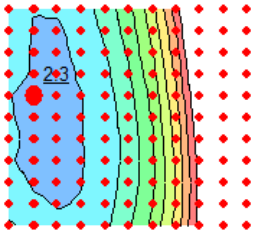
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 °

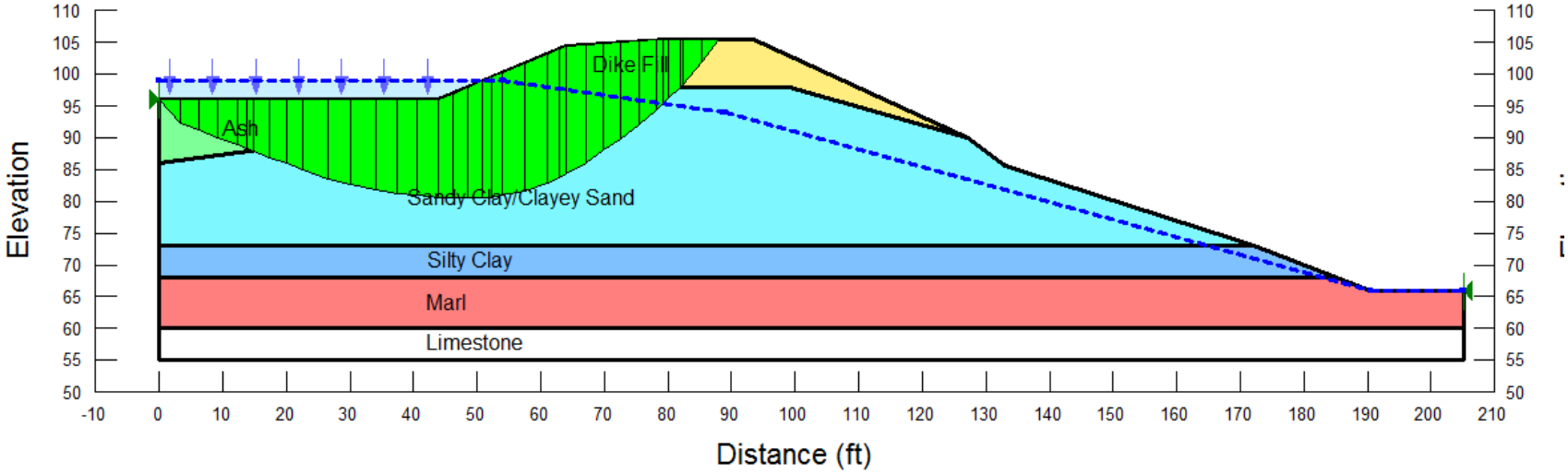
Title: Plant Scholz South Dike (SD-1)
Upstream, Steady State
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013



Name: Dike Fill Unit Weight: 120 pcf Cohesion': 400 psf Phi': 32 °
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 °

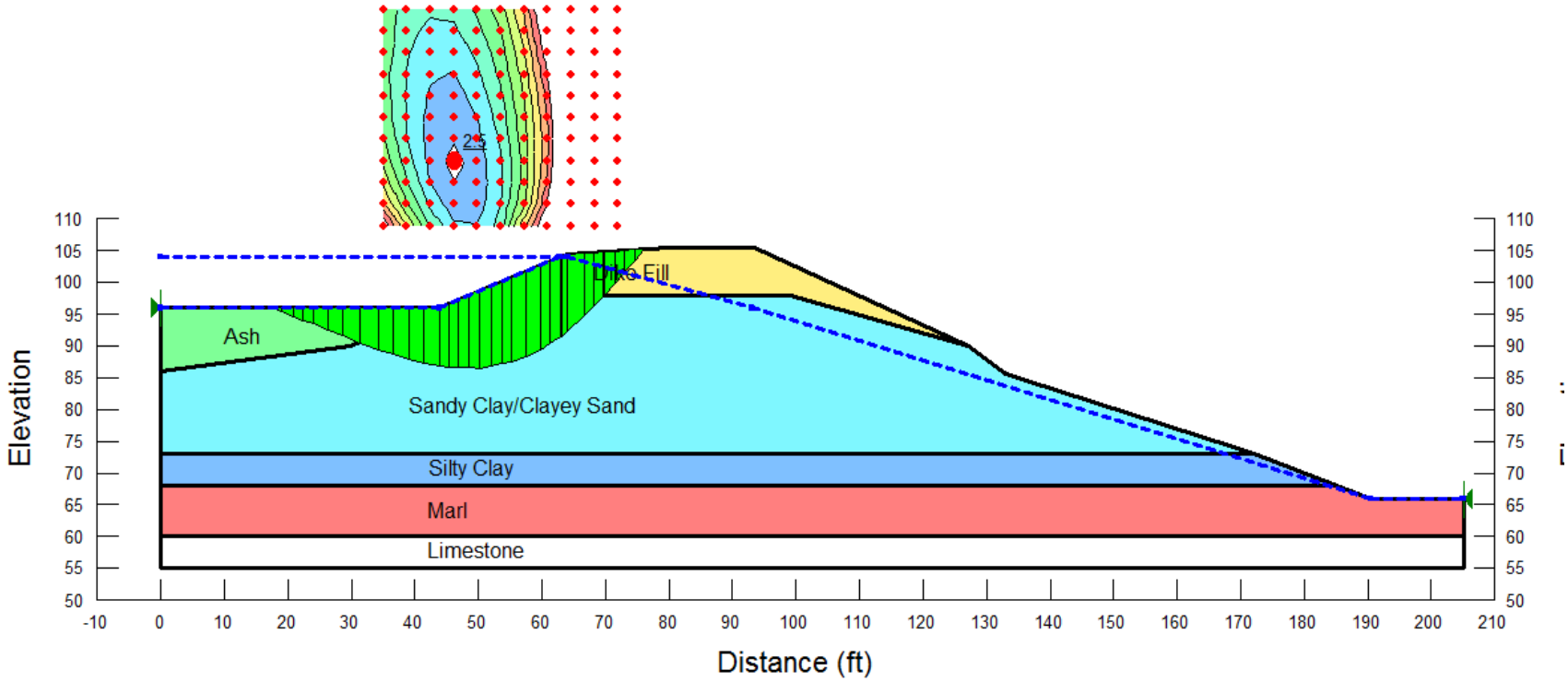
Title: Plant Scholz South Dike (SD-1)
Upstream, Seismic
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0.072
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013





Name: Dike Fill Unit Weight: 120 pcf Cohesion': 400 psf Phi': 32 °
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 °

Title: Plant Scholz South Dike (SD-1)
Upstream, Rapid Drawdown
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013



Name: Dike Fill Unit Weight: 120 pcf Cohesion': 400 psf Phi': 32 ° Total Cohesion: 600 psf Total Phi: 28 °
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 ° Total Cohesion: 0 psf Total Phi: 0 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 ° Total Cohesion: 0 psf Total Phi: 0 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 ° Total Cohesion: 0 psf Total Phi: 0 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 ° Total Cohesion: 100 psf Total Phi: 24 °

East Dike, ED-4

Downstream, Seismic

File Information

Title: Plant Scholz East Dike
Created By: Gallagher, Benjamin J.
Revision Number: 201
Last Edited By: Gallagher, Benjamin J.
Date: 1/12/2011
Time: 2:38:46 PM
File Name: East Dike Line 4.gsz
Directory: T:\ESEE MAJOR PROJECTS\PROJECTS\Scholz\2010\ES1874_Ash Pond Evaluation\SlopeStability\
Last Solved Date: 1/12/2011
Last Solved Time: 2:39:06 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Downstream, Seismic

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Apply Phreatic Correction: No
- Side Function
  - Interslice force function option: Half-Sine
- PWP Conditions Source: Piezometric Line
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Grid and Radius
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: Yes
- Tension Crack
  - Tension Crack Option: (none)

FOS Distribution
- FOS Calculation Option: Constant

Advanced
- Number of Slices: 30
- Optimization Tolerance: 0.01
- Minimum Slip Surface Depth: 5 ft
- Optimization Maximum Iterations: 10000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1
- Driving Side Maximum Convex Angle: 5 °
- Resisting Side Maximum Convex Angle: 1 °

Materials

Dike Ash

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Sluiced Ash

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 27 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fdn Sand

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 35 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fdn Clay

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 50 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fdn Marl

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 38 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fdn Limestone

Model: Bedrock (Impenetrable)
Pore Water Pressure
Piezometric Line: 1

Slip Surface Grid

Upper Left: (194.37502, 286.99107) ft
Lower Left: (196.50602, 183.66607) ft
Lower Right: (258.13802, 155.11807) ft
Grid Horizontal Increment: 15
Grid Vertical Increment: 15
Left Projection Angle: 0 °
Right Projection Angle: 0 °

Slip Surface Radius

Upper Left Coordinate: (50, 129) ft
Upper Right Coordinate: (290.866, 129.742) ft
Lower Left Coordinate: (43.7383, 51.9821) ft
Lower Right Coordinate: (290.227, 50.4909) ft
Number of Increments: 20
Left Projection: No
Left Projection Angle: 135 °
Right Projection: No
Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (50, 126) ft
Right Coordinate: (308, 100) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	50	129
	130	129
	163	110
	245	100
	308	95

Seismic Loads

Horz Seismic Load: 0.074
Ignore seismic load in strength: No

Regions

	Material	Points	Area (ft²)
Region 1	Fdn Limestone	18,16,17,19	2580
Region 2	Fdn Marl	16,14,15,17	7740
Region 3	Fdn Clay	14,12,13,15	1032
Region 4	Fdn Sand	12,10,20,22,8,9,11,13	3355.5
Region 5	Dike Ash	20,21,5,6,7,8,22	3894.75
Region 6	Sluiced Ash	10,1,2,3,4,5,21,20	1196

Points

	X (ft)	Y (ft)
Point 1	50	126
Point 2	70	126
Point 3	78	122
Point 4	98	116
Point 5	146	135
Point 6	163	135.5
Point 7	221	109
Point 8	246	100
Point 9	308	100
Point 10	50	95
Point 11	308	95
Point 12	50	85
Point 13	308	83
Point 14	50	80
Point 15	308	80
Point 16	50	50
Point 17	308	50
Point 18	50	40
Point 19	308	40
Point 20	66	95

Point 21	108	116
Point 22	163	95

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.3	(244.249, 236.599)	35.89873	(162.393, 135.482)	(223.56, 108.079)
2	3955	1.3	(244.249, 236.599)	130.646	(161.552, 135.457)	(225.846, 107.256)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	162.6964	135.17605	-1560.0546	18.352765	12.379096	0
2	Optimized	164.04285	133.81865	-1494.2105	68.242803	46.030352	0
3	Optimized	166.01425	132.1189	-1403.1375	125.79807	84.851873	0
4	Optimized	167.8714	130.82205	-1336.3866	151.23582	102.00985	0
5	Optimized	169.72855	129.5252	-1269.5915	175.94954	118.67947	0
6	Optimized	171.51995	128.3667	-1210.8935	206.68742	139.41243	0
7	Optimized	173.24565	127.34645	-1160.3627	219.76158	148.23106	0
8	Optimized	174.9714	126.3262	-1109.8319	232.86567	157.06988	0
9	Optimized	176.6189	125.3747	-1063.0162	249.21454	168.09733	0
10	Optimized	178.1881	124.4919	-1019.8624	259.04494	174.72802	0
11	Optimized	179.8085	123.59045	-975.92805	271.3689	183.04063	0
12	Optimized	181.48005	122.67035	-931.27467	281.23772	189.69723	0
13	Optimized	183.2724	121.7026	-884.52061	295.88826	199.57915	0
14	Optimized	185.18555	120.6872	-835.71916	305.88863	206.32449	0
15	Optimized	187.1063	119.67495	-787.14688	318.01524	214.50399	0
16	Optimized	189.0347	118.6658	-738.85764	328.18309	221.36229	0
17	Optimized	190.9687	117.78785	-698.80408	378.0634	255.00698	0
18	Optimized	192.90835	117.0412	-666.95278	370.17275	249.68467	0
19	Optimized	194.87885	116.2898	-635.08787	363.94503	245.48402	0
20	Optimized	196.88015	115.53365	-603.11612	353.75053	238.60775	0
21	Optimized	198.83475	114.80625	-	346.61759	233.79652	0

				572.60193			
22	Optimized	200.74265	114.1076	-543.5141	333.96365	225.26133	0
23	Optimized	202.65055	113.409	-514.4755	320.87167	216.43067	0
24	Optimized	204.71485	112.674	-484.28529	310.08296	209.1536	0
25	Optimized	206.93555	111.9026	-453.06304	289.76722	195.45046	0
26	Optimized	209.17745	111.1603	-423.80149	273.43962	184.43736	0
27	Optimized	211.44055	110.44715	-396.52159	244.61724	164.99641	0
28	Optimized	213.6912	109.7887	-372.56141	219.27405	147.90221	0
29	Optimized	215.9294	109.18495	-351.92035	180.58878	121.80867	0
30	Optimized	218.4591	108.60945	-335.26137	135.51387	91.405259	0
31	Optimized	220.43485	108.2964	-330.76363	88.564305	59.737378	0
32	Optimized	222.27985	108.16775	-336.77427	33.29666	22.458881	0

Slices of Slip Surface: 3955

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	3955	162.2759	134.8739	-1526.1388	37.784625	25.486052	0
2	3955	164.07405	133.4555	-1471.8146	96.155861	64.857947	0
3	3955	166.2222	131.8208	-1386.154	135.24018	91.220654	0
4	3955	168.37035	130.2546	-1304.7462	170.15018	114.76775	0
5	3955	170.5185	128.7539	-1227.467	201.54193	135.94175	0
6	3955	172.66665	127.31605	-1154.0705	229.96907	155.1161	0
7	3955	174.8148	125.9386	-1084.4671	255.86832	172.58536	0
8	3955	176.96295	124.6193	-1018.5083	279.58004	188.57912	0
9	3955	179.1111	123.3561	-956.03035	301.34406	203.25913	0
10	3955	181.25925	122.14715	-896.94493	321.29821	216.71838	0
11	3955	183.4074	120.99075	-841.12404	339.48158	228.98322	0
12	3955	185.55555	119.8854	-788.48715	355.83191	240.01165	0
13	3955	187.7037	118.8296	-738.96639	370.18401	249.69227	0
14	3955	189.85185	117.822	-692.42522	382.2729	257.84633	0
15	3955	192	116.8614	-648.83006	391.74283	264.23388	0

16	3955	194.14815	115.9467	-608.08516	398.16164	268.56342	0
17	3955	196.2963	115.07685	-570.16241	401.04497	270.50825	0
18	3955	198.44445	114.2509	-534.97454	399.87723	269.7206	0
19	3955	200.5926	113.468	-502.46362	394.15664	265.86201	0
20	3955	202.74075	112.7273	-472.60214	383.43143	258.62776	0
21	3955	204.8889	112.028	-445.30736	367.3475	247.77902	0
22	3955	207.03705	111.36945	-420.566	345.69251	233.17254	0
23	3955	209.1852	110.75105	-398.32392	318.42147	214.77799	0
24	3955	211.33335	110.17215	-378.5501	285.68867	192.69944	0
25	3955	213.4815	109.63225	-361.20562	247.82384	167.15929	0
26	3955	215.62965	109.13085	-346.26226	205.33914	138.503	0
27	3955	217.7778	108.66745	-333.69468	158.87205	107.16055	0
28	3955	219.92595	108.24165	-323.47135	109.15323	73.624783	0
29	3955	222.21145	107.8308	-315.22823	63.305198	42.699895	0
30	3955	224.6343	107.4395	-309.24907	21.446998	14.466183	0

North Dike, ND-6

Upstream, Rapid Drawdown

File Information

Title: Plant Scholz North Dike
Created By: Gallagher, Benjamin J.
Revision Number: 222
Last Edited By: Gallagher, Benjamin J.
Date: 1/23/2011
Time: 6:50:49 PM
File Name: North Dike Line 6.gsz
Directory: T:\ESEE MAJOR PROJECTS\PROJECTS\Scholz\2010\ES1874_Ash Pond Evaluation\SlopeStability\

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Upstream, Rapid Drawdown

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Apply Phreatic Correction: No
- Side Function
  - Interslice force function option: Half-Sine
- PWP Conditions Source: Piezometric Line
- Use Staged Rapid Drawdown: Yes

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Grid and Radius
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: Yes
- Tension Crack
  - Tension Crack Option: (none)

FOS Distribution
- FOS Calculation Option: Constant

Advanced
- Number of Slices: 30
- Optimization Tolerance: 0.01
- Minimum Slip Surface Depth: 5 ft
- Optimization Maximum Iterations: 10000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1
- Driving Side Maximum Convex Angle: 5 °
- Resisting Side Maximum Convex Angle: 1 °

Materials

Dike Ash

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Drawdown Total Cohesion: 100 psf
Drawdown Total Phi: 28 °
Pore Water Pressure
Piezometric Line: 1
Piezometric Line After Drawdown: 2

Sluiced Ash

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 27 °
Phi-B: 0 °
Drawdown Total Cohesion: 100 psf
Drawdown Total Phi: 24 °
Pore Water Pressure
Piezometric Line: 1
Piezometric Line After Drawdown: 2

Fdn Sand

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 35 °
Phi-B: 0 °
Drawdown Total Cohesion: 500 psf
Drawdown Total Phi: 22 °
Pore Water Pressure
Piezometric Line: 1
Piezometric Line After Drawdown: 2

Fdn Clay

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 50 psf
Phi: 28 °
Phi-B: 0 °
Drawdown Total Cohesion: 0 psf
Drawdown Total Phi: 0 °
Pore Water Pressure
Piezometric Line: 1
Piezometric Line After Drawdown: 2

Fdn Marl

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 38 °
Phi-B: 0 °
Drawdown Total Cohesion: 0 psf
Drawdown Total Phi: 0 °
Pore Water Pressure
Piezometric Line: 1
Piezometric Line After Drawdown: 2

Fdn Limestone

Model: Bedrock (Impenetrable)
Pore Water Pressure
Piezometric Line: 1
Piezometric Line After Drawdown: 2

Slip Surface Grid

Upper Left: (60.01054, 215.39798) ft
Lower Left: (55.01006, 137.0886) ft
Lower Right: (151.24569, 151.71264) ft
Grid Horizontal Increment: 15
Grid Vertical Increment: 15

Left Projection Angle: 0 °
Right Projection Angle: 0 °

Slip Surface Radius

Upper Left Coordinate: (50, 134) ft
Upper Right Coordinate: (265.47171, 147.27448) ft
Lower Left Coordinate: (50.40207, 55.56758) ft
Lower Right Coordinate: (266.83033, 52.17103) ft
Number of Increments: 25
Left Projection: No
Left Projection Angle: 135 °
Right Projection: No
Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (50, 125) ft
Right Coordinate: (250, 117) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	50	132
	112.505	132
	170	115
	219	110
	250	106

Piezometric Line 2

Coordinates

	X (ft)	Y (ft)
	50	129
	108.006	129
	112.505	132
	170	115
	219	110
	250	106

Regions

	Material	Points	Area (ft²)
Region 1	Fdn Limestone	18,16,17,19	3000
Region 2	Fdn Marl	16,14,15,17	9000
Region 3	Fdn Clay	14,12,13,15	900
Region 4	Fdn Sand	12,10,20,11,7,8,9,13	2715
Region 5	Dike Ash	20,4,5,6,7,11	903.25
Region 6	Sluiced Ash	1,2,3,4,20,10	285.25

Points

	X (ft)	Y (ft)
Point 1	50	125
Point 2	60	125
Point 3	84	119

Point 4	99	123
Point 5	114	133
Point 6	142	135.5
Point 7	172	121
Point 8	212	119
Point 9	250	117
Point 10	50	115
Point 11	170	120
Point 12	50	105
Point 13	250	104
Point 14	50	100
Point 15	250	100
Point 16	50	55
Point 17	250	55
Point 18	50	40
Point 19	250	40
Point 20	90	116.5

South Dike, SD-1

Downstream, Seismic

File Information

Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Revision Number: 87
File Version: 8.1
Tool Version: 8.11.1.7283
Date: 10/18/2013
Time: 10:49:36 AM
File Name: South Dike SD-1.gsz
Directory: T:\ESEE MAJOR PROJECTS\PROJECTS\Scholz\2013\ES2290\SlopeFiles\

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

Downstream, Seismic

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- Lambda
  - Lambda 1: -1
  - Lambda 2: -0.8
  - Lambda 3: -0.6
  - Lambda 4: -0.4
  - Lambda 5: -0.2
  - Lambda 6: 0
  - Lambda 7: 0.2
  - Lambda 8: 0.4
  - Lambda 9: 0.6
  - Lambda 10: 0.8
  - Lambda 11: 1
- PWP Conditions Source: Piezometric Line
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Grid and Radius
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: Yes
- Tension Crack
  - Tension Crack Option: (none)

F of S Distribution
- F of S Calculation Option: Constant

Advanced
- Number of Slices: 30
- F of S Tolerance: 0.01
- Minimum Slip Surface Depth: 0.1 ft
- Optimization Maximum Iterations: 2,000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1

Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Dike Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 400 psf
Phi': 32 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Residual Sandy Clay/Clayey Sand

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 300 psf
Phi': 22 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Residual Silty Clay

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 600 psf
Phi': 20 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marl

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 0 psf
Phi': 38 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Limestone

Model: Bedrock (Impenetrable)
Pore Water Pressure
Piezometric Line: 1

Sluiced Ash

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion': 0 psf
Phi': 27 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Grid

Upper Left: (133.50955, 198.0175) ft
Lower Left: (133.50955, 147.99485) ft
Lower Right: (185.52425, 147.99485) ft
Grid Horizontal Increment: 20
Grid Vertical Increment: 20
Left Projection Angle: 0 °
Right Projection Angle: 0 °

Slip Surface Radius

Upper Left Coordinate: (11, 102.08545) ft
Upper Right Coordinate: (173, 102.08545) ft
Lower Left Coordinate: (11, 55.0066) ft
Lower Right Coordinate: (173, 55.0066) ft
Number of Increments: 15
Left Projection: No
Left Projection Angle: 135 °
Right Projection: No
Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (0, 96) ft
Right Coordinate: (205, 66) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	99
Coordinate 2	54	99
Coordinate 3	89	94
Coordinate 4	190.5	66
Coordinate 5	205	66

Seismic Coefficients

Horz Seismic Coef.: 0.072
Ignore seismic load in strength: No

Points

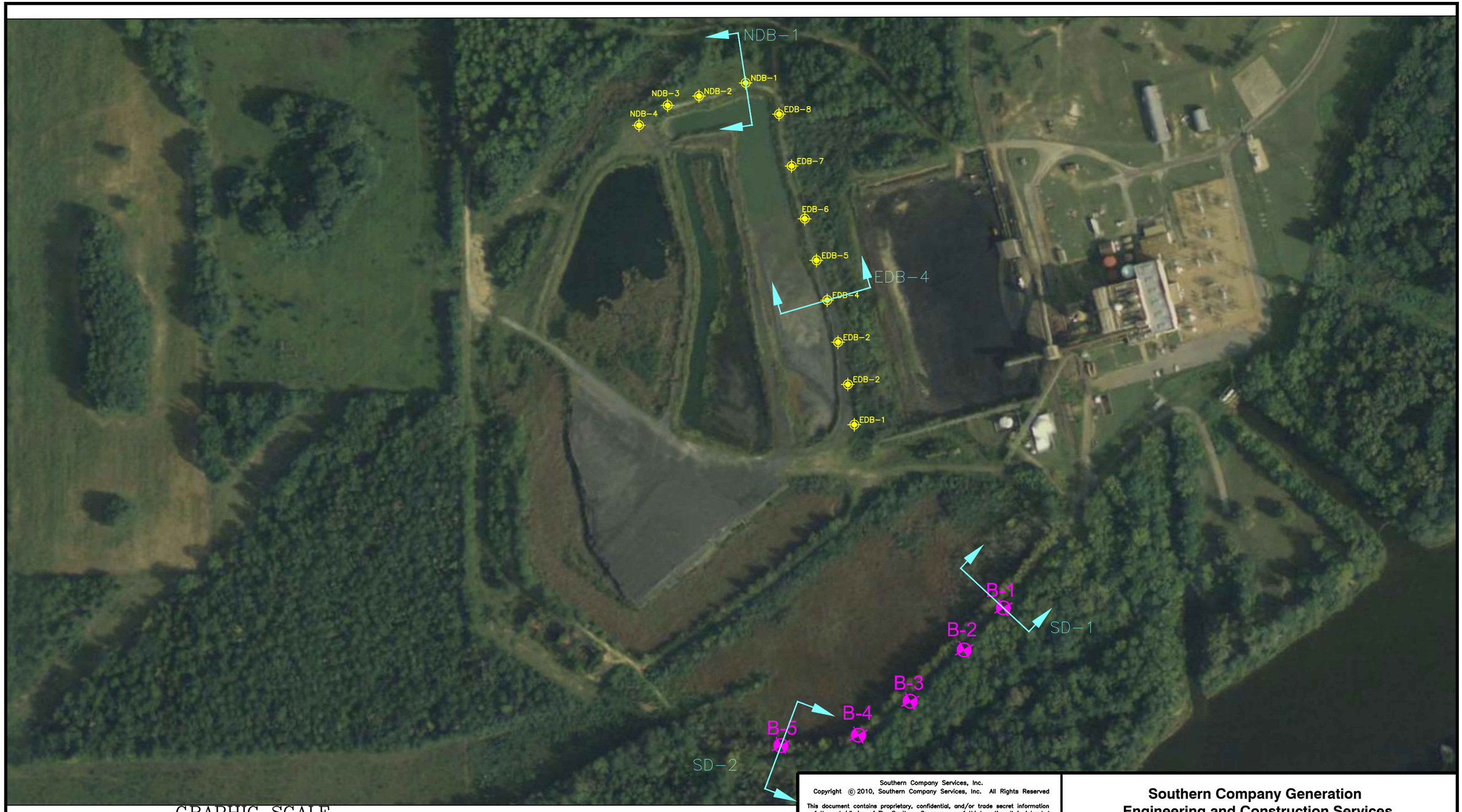
	X (ft)	Y (ft)
Point 1	30	90
Point 2	64	104.5
Point 3	80	105.5
Point 4	93.5	105.5
Point 5	127	90
Point 6	133	85.5
Point 7	190.5	66
Point 8	99	98
Point 9	48.5	98
Point 10	0	73
Point 11	0	68
Point 12	0	60
Point 13	205	60
Point 14	205	66
Point 15	172	73
Point 16	185	68
Point 17	0	55
Point 18	205	55
Point 19	0	96
Point 20	43.875	96
Point 21	0	86

Point 22	182.5	71

Regions

	Material	Points	Area (ft²)
Region 1	Dike Fill	9,2,3,4,5,8	367.25
Region 2	Residual Sandy Clay/Clayey Sand	1,20,9,8,5,6,15,10,21	3,021.3
Region 3	Residual Silty Clay	10,11,16,15	892.5
Region 4	Marl	11,12,13,14,7,16	1,605.5
Region 5	Limestone	12,13,18,17	1,025
Region 6	Sluiced Ash	1,21,19,20	281.63

ATTACHMENT B



GRAPHIC SCALE

250 0 125 250 500 1000

(IN FEET)

1 inch = 250 ft.

Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\Scholz\2009\South Embankment Borings\Figure 1_recover.dwg Sep 10, 2012 - 10:34am

Southern Company Generation
Engineering and Construction Services

FOR

Gulf Power Company

PLANT SCHOLZ

North and East Dike
Boring Locations

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
AS SHOWN		**FIGURE 1**	1	FINAL	0

ANSI B: 17x11 Acad2009

4 3 2 1

D C B A

986.90'
TRAVERSE LINE

658.93'
TRAVERSE LINE

N 27°53'40" E

ASH POND

APPROXIMATE LIMITS OF POND

GRAVEL ROAD

617.07'
TRAVERSE LINE

B-1

B-2

B-3

B-4

B-5

SD-1

N 86°01'08" W
90.77'

S 65°11'05" W
191.43'

S 44°51'47" W

CONCRETE STEPS

N

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PITTMAN, GLAZE AND ASSOCIATES, INC.
LAND SURVEYORS
5700 N. DAVIS HIGHWAY, STE. 13
PENSACOLA, FL 32503
Phone (850) 434-6666 Fax (850) 434-6661
Email: pgasurvey@bellsouth.net

Measurements made in accordance with United States Standards.
Bearing Reference NORTH BASED ON STATE PLANE COORDINATE SYSTEM (GRID NORTH)
Ordered By SUSAN HARRIS Elevation Reference NAVD 88
Encroachments
Source of Information PUBLIC RECORDS; INFORMATION FURNISHED BY CLIENT

TOPOGRAPHIC SURVEY OF A PORTION OF ASH PONDS, SCHOLZ PLANT, SNEADS, FLORIDA, SECTION 12, T-3-N, R-07-W

I hereby certify that this survey was made under my responsible charge and meets the Minimum Technical Standards as set forth by the Florida Board of Professional Surveyors & Mappers in Chapter 5J-17.050, 5J-17.051 and 5J-17.052, pursuant to Section 472.027 Florida Statutes.

David O. Glaze
FSM #5605

Walter J. Glaze
FSM #6190

Southern Company Generation
Engineering and Construction Services
FOR
Gulf Power Company

FIGURE 2
PLANT SCHOLZ
SOUTH DIKE
BORING LOCATIONS

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV.
1"= 40'		ES2290 TOPO	1	FINAL	0

ANSI D: 34X22 CIVIL 3D 2013

ATTACHMENT C

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 134.7 **COORDINATES:** N 606,932.81 E 1,846,006.49
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 61 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	2-3-2 (5)	100	
5				SS -2	4.5-6.0	2-2-2 (4)	100	
				SS -3	7.5-9.0	3-4-3 (7)	100	
10				SS -4	9.5-11.0	1-3-5 (8)	100	
15				SS -5	14.5-16.0	6-7-9 (16)	100	
20				SS -6	19.5-21.0	6-7-6 (13)	100	
25				SS -7	24.5-26.0	2-3-3 (6)	100	
30				SS -8	29.5-31.0	3-2-3 (5)	100	
35				SS -9	34.5-36.0	3-2-2 (4)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Silty Sand (SM)** - brown, moist, loose, low plasticity	95.2	SS -10	39.5-41.0	2-1-2 (3)	100	
45		**Coal Combustion Byproduct (ASH)** - black, wet, very loose, no plasticity, with fine sand	90.2	SS -11	44.5-46.0	WH-WH-1 (1)	100	(MC = 23.5%; PL=NP; FC = 92.3%)
50		**Poorly-graded Sand (SP)** - brown, wet, loose to medium dense, fine grain	85.2	SS -12	49.5-51.0	2-1-4 (5)	100	(MC = 16.4%; PL=NP; FC = 28.2%)
55				SS -13	54.5-56.0	3-4-7 (11)	100	
60			73.7	SS -14	59.5-61.0	24-26-35 (61)	100	(MC = 33%; LL=53; PI=32; FC = 48.8%)
		Bottom of borehole at 61.0 feet.						
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 134.1 **COORDINATES:** N 607,047.50 E 1,845,988.23
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 56 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	4-7-8 (15)	100	
5				SS -2	4.5-6.0	4-5-5 (10)	100	
				SS -3	7.5-9.0	3-4-4 (8)	100	
10				SS -4	9.5-11.0	2-2-5 (7)	100	
			119.6					
15		**Poorly-graded Sand (SP)** - dark br, very moist, loose, no plasticity		SS -5	14.5-16.0	2-2-2 (4)	100	
			114.6					
20		**Coal Combustion Byproduct (ASH)** - blackish gray, wet, loose, no plasticity		SS -6	19.5-21.0	1-1-1 (2)	100	
25				SS -7	24.5-26.0	WH-WH-WH (0)	100	(MC = 36.6%; PL=NP; FC = 74.7%)
30				SS -8	29.5-31.0	1-1-2 (3)	100	
35				SS -9	34.5-36.0	2-2-3 (5)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Coal Combustion Byproduct (ASH)***(con't)*		SS -10	39.5-41.0	WH-WH-2 (2)	100	
			89.6					
45		**Silty Sand (SM)** - tan, wet, loose, no plasticity, fine to medium grain		SS -11	44.5-46.0	WH-WH-2 (2)	100	(MC = 15.8%; FC = 12.2%)
			84.6					
50		**Poorly-graded Sand (SP)** - tan, wet, dense, fine to medium grain		SS -12	49.5-51.0	5-5-15 (20)	100	
55			78.1	SS -13	54.5-56.0	13-50 (50)	56	
		Bottom of borehole at 56.0 feet.						
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 134.3 **COORDINATES:** N 607,167.33 E 1,845,960.46
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 55 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 22 ft. after 24 hrs.
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	3-3-3 (6)	100	
5				SS -2	4.5-6.0	2-3-3 (6)	100	
				SS -3	7.5-9.0	2-2-2 (4)	100	
10				SS -4	9.5-11.0	3-2-3 (5)	100	
15				SS -5	14.5-16.0	4-5-7 (12)	100	
20		▼		SS -6	19.5-21.0	4-6-8 (14)	100	
25				SS -7	24.5-26.0	1-1-3 (4)	100	
30				SS -8	29.5-31.0	1-1-2 (3)	100	
35				SS -9	34.5-36.0	2-3-2 (5)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40			94.8					
		Well-graded Sand with Silt (SW-SM) - black, tan and brown, moist, v. loose to dense, no plasticity, fine to medium grain		SS -10	39.5-41.0	WH-WH-2 (2)	100	(MC = 39.2%; FC = 11.3%)
45				SS -11	44.5-46.0	10-23-24 (47)	100	
			84.8					
50		**Poorly-graded Sand with Silt (SP-SM)** - black, tan and brown, moist, very loose, no plasticity, with gravel		SS -12	49.5-51.0	WH-10-2 (12)	100	(MC = 13.8%; FC = 9.9%)
			79.8					
55		**Poorly-graded Sand (SP)** - gray, moist, very dense	79.3	SS -13	54.5-56.0	5-10-50 (60)	89	
		Bottom of borehole at 55.0 feet.						
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 135.1 **COORDINATES:** N 607,287.08 E 1,845,929.45
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	3-5-6 (11)	100	
5				SS -2	4.5-6.0	3-3-2 (5)	100	
				SS -3	7.5-9.0	2-2-2 (4)	100	
10				SS -4	9.5-11.0	3-6-7 (13)	100	
15				SS -5	14.5-16.0	2-2-2 (4)	100	
20				SS -6	19.5-21.0	3-4-4 (8)	100	
25				SS -7	24.5-26.0	3-4-4 (8)	100	
30				SS -8	29.5-31.0	1-1-2 (3)	100	
35				SS -9	34.5-36.0	WH-1-2 (3)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Silty Sand (SM)** - black, wet, loose to medium dense, no plasticity	95.6	SS -10	39.5-41.0	WH-WH-4 (4)	100	(MC = 37.2%; PL=NP; FC = 29.2%)
45				SS -11	44.5-46.0	4-6-8 (14)	100	
50		**Poorly-graded Sand (SP)** - tan/br, very damp, dense	85.6 84.1	SS -12	49.5-51.0	3-16-24 (40)	100	
		Bottom of borehole at 51.0 feet.						
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 135.2 **COORDINATES:** N 607,400.29 E 1,845,898.98
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 46 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp to wet, no plasticity						
				SS -1	2.5-4.0	3-5-4 (9)	100	
5				SS -2	4.5-6.0	2-1-2 (3)	100	
				SS -3	7.5-9.0	1-2-2 (4)	100	
10				SS -4	9.5-11.0	2-2-3 (5)	100	
15				SS -5	14.5-16.0	2-1-1 (2)	100	
20				SS -6	19.5-21.0	2-3-3 (6)	100	
25				SS -7	24.5-26.0	2-3-5 (8)	100	
30				SS -8	29.5-31.0	1-1-1 (2)	100	(MC = 48.8%; FC = 85.6%)
35				SS -9	34.5-36.0	1-2-3 (5)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Poorly-graded Sand with Silt (SP-SM)** - brown, very damp, medium dense, low plasticity	95.7	SS -10	39.5-41.0	6-9-12 (21)	100	(MC = 14.8%; LL=28; PI=5; FC = 8.9%)
45		**Coal Combustion Byproduct (ASH)** - tannish black, moist, medium dense, no plasticity	90.7 89.2	SS -11	44.5-46.0	1-3-13 (16)	100	(MC = 22.2%; FC = 90.9%)
		Bottom of borehole at 46.0 feet.						
50								
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/1/2010 **COMPLETED** 3/1/2010 **SURF. ELEV.** 134.1 **COORDINATES:** N 607,518.54 E 1,845,865.70
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 46 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	1-1-2 (3)	100	
5				SS -2	4.5-6.0	1-2-2 (4)	100	
				SS -3	7.5-9.0	WH-WH-WH (0)	100	(MC = 66.5%; FC = 90%)
10		- wet below 9.5 ft.		SS -4	9.5-11.0	1-2-1 (3)	100	
15				SS -5	14.5-16.0	1-1-1 (2)	100	(MC = 38.4%; FC = 79.4%)
20				SS -6	19.5-21.0	2-4-3 (7)	100	
25				SS -7	24.5-26.0	WH-WH-WH (0)	100	(MC = 63.8%; FC = 87.1%)
30				SS -8	29.5-31.0	WH-WH-1 (1)	100	
35				SS -9	34.5-36.0	WH-WH-2 (2)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40			94.6					
		Poorly-graded Sand (SP) - brown, very damp, med dense to very dense		SS -10	39.5-41.0	3-6-8 (14)	100	
45			88.1	SS -11	44.5-46.0	35-38-50 (88)	87	
		Bottom of borehole at 46.0 feet.						
50								
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 132.9 **COORDINATES:** N 607,668.59 E 1,845,828.53
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 41 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 23.5 ft. after 24 hrs.
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, loose, no plasticity						
				SS -1	2.5-4.0	2-2-2 (4)	100	
5				SS -2	4.5-6.0	1-1-2 (3)	100	
				SS -3	7.5-9.0	1-1-1 (2)	100	
10				SS -4	9.5-11.0	2-2-2 (4)	100	
15				SS -5	14.5-16.0	2-2-2 (4)	100	
20				SS -6	19.5-21.0	1-1-3 (4)	100	
		▼						
25				SS -7	24.5-26.0	WH-1-1 (2)	100	
30				SS -8	29.5-31.0	WH-1-1 (2)	100	(MC = 53.2%; FC = 83.5%)
			98.4					
35		**Poorly-graded Sand (SP)** - red/white, very damp, medium dense		SS -9	34.5-36.0	4-7-8 (15)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Poorly-graded Sand (SP)***(con't)*	91.9	SS -10	39.5-41.0	4-5-10 (15)	100	
		Bottom of borehole at 41.0 feet.						
45								
50								
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 133.5 **COORDINATES:** N 607,816.08 E 1,845,792.45
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, loose, no plasticity		SS -1	2.5-4.0	4-4-5 (9)	100	
5				SS -2	4.5-6.0	1-1-4 (5)	100	
			126.0					
		Poorly-graded Sand (SP) - brown, damp, medium dense, no plasticity, fine to coarse grain, trace gravel	124.0	SS -3	7.5-9.0	5-7-9 (16)	100	
10		**Coal Combustion Byproduct (ASH)** - black, damp, loose, no plasticity		SS -4	9.5-11.0	2-2-3 (5)	100	
15				SS -5	14.5-16.0	8-5-6 (11)	100	
			114.0					
20		**Silty Sand (SM)** - tan and brown, wet, medium dense, no plasticity		SS -6	19.5-21.0	7-6-8 (14)	100	(MC = 11.6%; PL=NP; FC = 32.8%)
			109.0					
25		**Clayey Sand (SC)** - brown, wet, loose, low plasticity		SS -7	24.5-26.0	3-2-2 (4)	100	(MC = 18.4%; LL=24; PI=13; FC = 31.9%)
			104.0					
30		**Silty Sand (SM)** - tannish red, moist, medium dense, no plasticity		SS -8	29.5-31.0	6-6-8 (14)	100	(MC = 18.4%; PL=NP; FC = 43.4%)
			99.0					
35		**Poorly-graded Sand (SP)** - tan and brown, very damp, loose	97.5	SS -9	34.5-36.0	6-5-4 (9)	100	
		Bottom of borehole at 36.0 feet.						

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 135.1 **COORDINATES:** N 607,905.14 E 1,845,697.72
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Clayey Sand (SC) - red, moist, loose, low plasticity						
				SS -1	2.5-4.0	4-2-2 (4)	100	
5			130.6					
		Coal Combustion Byproduct (ASH) - black, wet, very loose		SS -2	4.5-6.0	WH-1-1 (2)	100	(MC = 51.1%; PL=NP; FC = 62.5%)
			127.6					
		Poorly-graded Sand (SP) - white and tan, wet, medium dense		SS -3	7.5-9.0	3-5-6 (11)	100	
10			125.6					
		Coal Combustion Byproduct (ASH) - black, wet, loose		SS -4	9.5-11.0	4-4-4 (8)	100	
			120.6					
15		**Poorly-graded Sand (SP)** - tan and red, wet, medium dense		SS -5	14.5-16.0	7-9-9 (18)	100	
20				SS -6	19.5-21.0	10-13-14 (27)	100	
			110.6					
25		**Clayey Sand (SC)** - tan and red, wet, very loose, medium plasticity		SS -7	24.5-26.0	1-2-2 (4)	100	
			106.1					
30		**Sandy Fat Clay (CH)** - reddish gray, moist, stiff, low plasticity		SS -8	29.5-31.0	6-5-7 (12)	100	(MC = 19.4%; LL=51; PI=29; FC = 67.4%)
			100.6					
35		**Clayey Sand (SC)** - red and brown, moist, medium dense, no plasticity	99.1	SS -9	34.5-36.0	6-9-8 (17)	100	
		Bottom of borehole at 36.0 feet.						

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 134.5 **COORDINATES:** N 607,867.70 E 1,845,565.08
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 10.9 ft. after 24 hrs.
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - red and black, moist		SS -1	2.5-4.0	1-1-1 (2)	100	
5		- black		SS -2	4.5-6.0	1-2-2 (4)	100	
		- tan and black	125.0	SS -3	7.5-9.0	2-3-4 (7)	100	
10		**Silty Sand (SM)** - red, moist, medium dense, fine to medium grain		SS -4	9.5-11.0	3-5-5 (10)	100	
15		- tan and brown		SS -5	14.5-16.0	11-12-13 (25)	100	(MC = 12.2%; FC = 19.3%)
20				SS -6	19.5-21.0	10-11-14 (25)	100	
25		**Clayey Sand (CL)** - red, brown and gray, wet, medium dense, low plasticity, fine to medium grain	110.0	SS -7	24.5-26.0	5-6-6 (12)	100	(MC = 16.1%; LL=46; PI=27; FC = 47.2%)
30				SS -8	29.5-31.0	4-3-5 (8)	100	
35		**Poorly-graded Sand (SP)** - white and tan, moist, dense	100.0 98.5	SS -9	34.5-36.0	15-40-49 (89)	100	
		Bottom of borehole at 36.0 feet.						

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/16/2010 **COMPLETED** 2/16/2010 **SURF. ELEV.** 133.8 **COORDINATES:** N 607,841.00 E 1,845,475.95
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - dark gray, damp, loose						
				SS -1	2.5-4.0	2-2-3 (5)	100	
5				SS -2	4.5-6.0	2-3-4 (7)	100	
			126.3					
		Clayey Sand (SC) - red, wet, medium dense, low plasticity, fine to medium grain	124.3	SS -3	7.5-9.0	4-7-8 (15)	100	(MC = 30.8%; LL=28; PI=10; FC = 29.5%)
10		**Poorly-graded Sand (SP)** - red/tan/br, moist, medium dense		SS -4	9.5-11.0	5-7-8 (15)	100	
15				SS -5	14.5-16.0	9-13-15 (28)	100	
			114.3					
20		**Silty Sand (SM)** - gray, moist, medium dense, fine to medium grain		SS -6	19.5-21.0	8-9-10 (19)	100	(MC = 11.3%; PL=NP; FC = 16.5%)
			109.3					
25		**Poorly-graded Sand (SP)** - white/tan/br/gray, moist, loose		SS -7	24.5-26.0	5-3-3 (6)	100	
			104.3					
30		**Sandy Silt (ML)** - brown, moist, very dense		SS -8	29.5-31.0	17-30-50 (80)	83	(MC = 13.9%; FC = 54.5%)
35				SS -9	34.5-36.0	15-33-50 (83)	87	
			97.8					
		Bottom of borehole at 36.0 feet.						

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/16/2010 **COMPLETED** 2/16/2010 **SURF. ELEV.** 132.2 **COORDINATES:** N 607,784.60 E 1,845,394.55
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, wet		SS -1	2.5-4.0	3-4-5 (9)	100	
5				SS -2	4.5-6.0	2-2-3 (5)	100	
				SS -3	7.5-9.0	WH-WH-WH (0)	100	
10				SS -4	9.5-11.0	WH-WH-WH (0)	100	(MC = 69.7%; PL=NP; FC = 92.9%)
15				SS -5	14.5-16.0	WH-WH-WH (0)	100	(MC = 61.1%; PL=NP; FC = 95.6%)
20			112.7					
		Clayey Sand (SC) - tan and brown, very damp, loose, low plasticity		SS -6	19.5-21.0	3-3-5 (8)	100	
25			107.7					
		Poorly-graded Sand (SP) - tan, moist, very dense		SS -7	24.5-26.0	15-47-50 (97)	87	
30				SS -8	29.5-31.0	10-27-50 (77)	87	
35				SS -9	34.5-36.0	29-50 (50)	60	
			96.2					
		Bottom of borehole at 36.0 feet.						

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DRILLING LOG

GEOLOGICAL SERVICES

Hole No. B-1

Sheet 1 of 2

SITE **Plant Scholz Ash Pond** HOLE DEPTH 50' SURF.ELEV. NA

LOCATION Sneads, Florida GPS coordinates N 30 40.008 W 084 53.296

DRILLING METHOD H.S.A. NO. SAMPLES NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA

TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/29/2009

DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/29/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0									
1									
2									
3									
4									
5		tan to olive brown clayey silty fine to medium SAND (SM-SC)		3.5-5.0	25-12-16	28			
6									
7									
8									
9									
10		white gravelly CLAY (CL)		8.5-10	2-4-6	10	med plastic		
11									
12									
13									
14									
15		white to tan gravelly CLAY w/ coarse sand (CL)		13.5-15	4-4-8	12			
16									
17									
18									
19									
20		white to tan gravelly CLAY w/ coarse sand (CL)		18.5-20	4-5-6	11			
21									
22									
23									
24									
25		white lean CLAY few gravel		23.5-25	2-4-3	7			

SOUTHERN COMPANY
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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-1

Sheet 2 of 2

SITE **Plant Scholz Ash Pond** TOTAL DEPTH 50' SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
26									
27									
28									
29									
30		olive grey fine sandy CLAY (CH)		28.5-30	1-2-2	4	high plastic		
31									
32									
33									
34									
35		bluish grey silty CLAY (CL)		33.5-35	2-4-8	12	begin native?		
36									
37									
38									
39									
40		dirty white weathered limestone w/ bluish silty CLAY (CL)		38.5-40	35-33-50/3	ref			
41									
42									
43									
44									
45		white weathered limestone and CLAY (CL)		43.5-45	50/5	ref			
46									
47									
48									
49									
50		coarse-sand sized limestone fragments w/ white silty CLAY (CL)		48.5-50	2-3-5	8			
51		Boring terminated @ 50'							
52									
53									
54									
55									
56									
57									

Form GS9901 7-26-2004

SOUTHERN COMPANY
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DRILLING LOG

GEOLOGICAL SERVICES

Hole No. B-2

Sheet 1 of 2

SITE **Plant Scholz Ash Pond** HOLE DEPTH 50' SURF.ELEV. NA

LOCATION Sneads, Florida GPS coordinates N 30 39.992 W 084 53.316

DRILLING METHOD H.S.A. NO. SAMPLES NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA

TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/29/2009

DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/29/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0									
1									
2									
3									
4									
5		orange clayey fine to medium SAND (SP-SC)		3.5-5.0	5-8-10	18			
6									
7									
8									
9									
10		light brown clayey fine SAND (SP-SC)		8.5-10	1-1-2	3	wet		
11									
12									
13									
14									
15		light brown clayey fine SAND (SP-SC)		13.5-15	2-1-3	4			
16									
17									
18									
19									
20		tan sandy CLAY-clay SAND mix (SC)		18.5-20	0-0-1	1			
21									
22									
23									
24									
25		olive grey fine sandy CLAY w/ gravel (CH)		23.5-25	3-4-4	8	limestone frags		

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-2

Sheet 2 of 2

SITE **Plant Scholz Ash Pond** TOTAL DEPTH 50' SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
26									
27									
28									
29									
30		white to tan gravelly CLAY (GC-CH)		28.5-30	2-3-1	4			
31									
32									
33									
34									
35		white to tan gravelly CLAY (GC-CH)		33.5-35	2-3-3	6			
36									
37									
38									
39									
40		dirty white weathered limestone w/ bluish silty CLAY (CL)		38.5-40	2-3-3	6			
41									
42									
43									
44									
45		coarse-sand sized limestone fragments w/ white silty CLAY (CL)		43.5-45	25-50/3	ref			
46									
47									
48									
49									
50		white silty CLAY w/ limestone fragments (CL)		48.5-50	11-15-24	39			
51		Boring terminated @ 50'							
52									
53									
54									
55									
56									
57									

Form GS9901 7-26-2004

SOUTHERN COMPANY
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DRILLING LOG

GEOLOGICAL SERVICES

Hole No. B-3

Sheet 1 of 2

SITE **Plant Scholz Ash Pond** HOLE DEPTH 50' SURF.ELEV. NA

LOCATION Sneads, Florida GPS coordinates N 30 39.964 W 084 53.350

DRILLING METHOD H.S.A. NO. SAMPLES NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA

TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/29/2009

DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/29/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0									
1									
2									
3									
4									
5		orange clayey SAND (SC)		3.5-5.0	5-7-14	21			
6									
7									
8									
9									
10		light to dark brown silty clayey SAND (SM-SC)		8.5-10	6-4-3	7			
11									
12									
13									
14									
15		olive grey fine sandy CLAY (CH)		13.5-15	1-1-1	2			
16									
17									
18									
19									
20		olive grey fine sandy CLAY (CH)		18.5-20	WOH	0			
21									
22									
23									
24									
25		olive grey clayey SAND- SAND CLAY mix (SC)		23.5-25	WOH	0			

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-3

Sheet 2 of 2

SITE **Plant Scholz Ash Pond** TOTAL DEPTH 50' SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
26									
27									
28									
29									
30		olive grey silty CLAY (CL)		28.5-30	3-3-4	7			
31									
32									
33									
34									
35		white silty CLAY w/ limestone fragments (CL)		33.5-35	2-3-9	12			
36									
37									
38									
39									
40		bluish silty CLAY w/ limestone fragments (CL)		38.5-40	7-8-4	12			
41									
42									
43									
44									
45		white limestone fragments w/ white clay (GC-CL)		43.5-45	50/2	ref			
46									
47									
48									
49									
50		white limestone fragments w/ white clay (GC-CL)		48.5-50	9-42-50/4	ref			
51		Boring terminated @ 50'							
52									
53									
54									
55									
56									
57									

Form GS9901 7-26-2004

SOUTHERN COMPANY
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DRILLING LOG

GEOLOGICAL SERVICES

Hole No. B-4

Sheet 1 of 2

SITE: **Plant Scholz Ash Pond** | HOLE DEPTH: 47' | SURF.ELEV.: NA

LOCATION: Sneads, Florida | GPS coordinates N: 30 39.948 | W: 084 53.378

DRILLING METHOD: Mud rotary | NO. SAMPLES: NA | NO. U.D. SAMPLES: NA

CASING SIZE: NA | LENGTH: NA | CORE SIZE: NA | TOTAL % REC.: NA

WATER TABLE DEPTH: NA | ELEV.: NA | TIME AFTER COMP.: NA | DATE TAKEN: NA

TYPE GROUT: NA | QUANTITY: NA | MIX: NA | DRILLING START DATE: 10/30/2009

DRILLER: Universal | RECORDER: M. Boatright | APPROVED: B. Coates | DRILLING COMP. DATE: 10/30/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0									
1									
2									
3									
4									
5		light brown clayey fine to med SAND (SP-SC)		3.5-5.0	8-6-7	13			
6									
7									
8									
9									
10		light brown clayey fine SAND (SP-SC)		8.5-10	2-1-2	3			
11									
12									
13									
14									
15		olive grey silty CLAY (CH)		13.5-15	1-1-2	3			
16									
17									
18									
19									
20		olive grey silty CLAY (CH)		18.5-20	0-0-3	3			
21									
22									
23									
24									
25		olive grey silty clay (CH)		23.5-25	0-0-1	1			

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-4

Sheet 2 of 2

SITE **Plant Scholz Ash Pond** TOTAL DEPTH 47' SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
26									
27									
28									
29									
30		No Recovery		28.5-30	1-1-1	2			
31									
32									
33									
34									
35		light grey clayey SILT (ML) w/ rock fragments		33.5-35	7-18-21	39			
36									
37									
38									
39									
40		white to bluish CLAY to silty CLAY (CL)		38.5-40	13-14-50/3	ref			
41									
42									
43									
44									
45		rock fragments		43.5-45	50/1	ref			
46									
47									
48		Refusal @ 47'							
49									
50									
51									
52									
53									
54									
55									
56									
57									

Form GS9901 7-26-2004

SOUTHERN COMPANY
Energy to Serve Your World™

DRILLING LOG

GEOLOGICAL SERVICES

Hole No. B-5

Sheet 1 of 2

SITE **Plant Scholz Ash Pond** HOLE DEPTH 50' SURF.ELEV. NA

LOCATION Sneads, Florida GPS coordinates N 30 39.943 W 084 53.420

DRILLING METHOD Mud rotary NO. SAMPLES NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA

TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/30/2009

DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/30/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0									
1									
2									
3									
4									
5		grey brown siilty fine SAND (SP) trace clay		3.5-5.0	8-11-11	22			
6									
7									
8									
9									
10		olive grey clayey silty fine SAND (SP)		8.5-10	1-1-1	2			
11									
12									
13									
14									
15		grey to dark brown clayey fine to med SAND (SP-SC)		13.5-15	3-1-2	3			
16									
17									
18									
19									
20		orange brown clayey fine to med SAND (SP-SC)		18.5-20	9-9-10	19			
21									
22									
23									
24									
25		white to yellowish brown silty CLAY (CH)		23.5-25	0-0-1	1			

SOUTHERN COMPANY
Energy to Serve Your World™

DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-5
Sheet 2 of 2

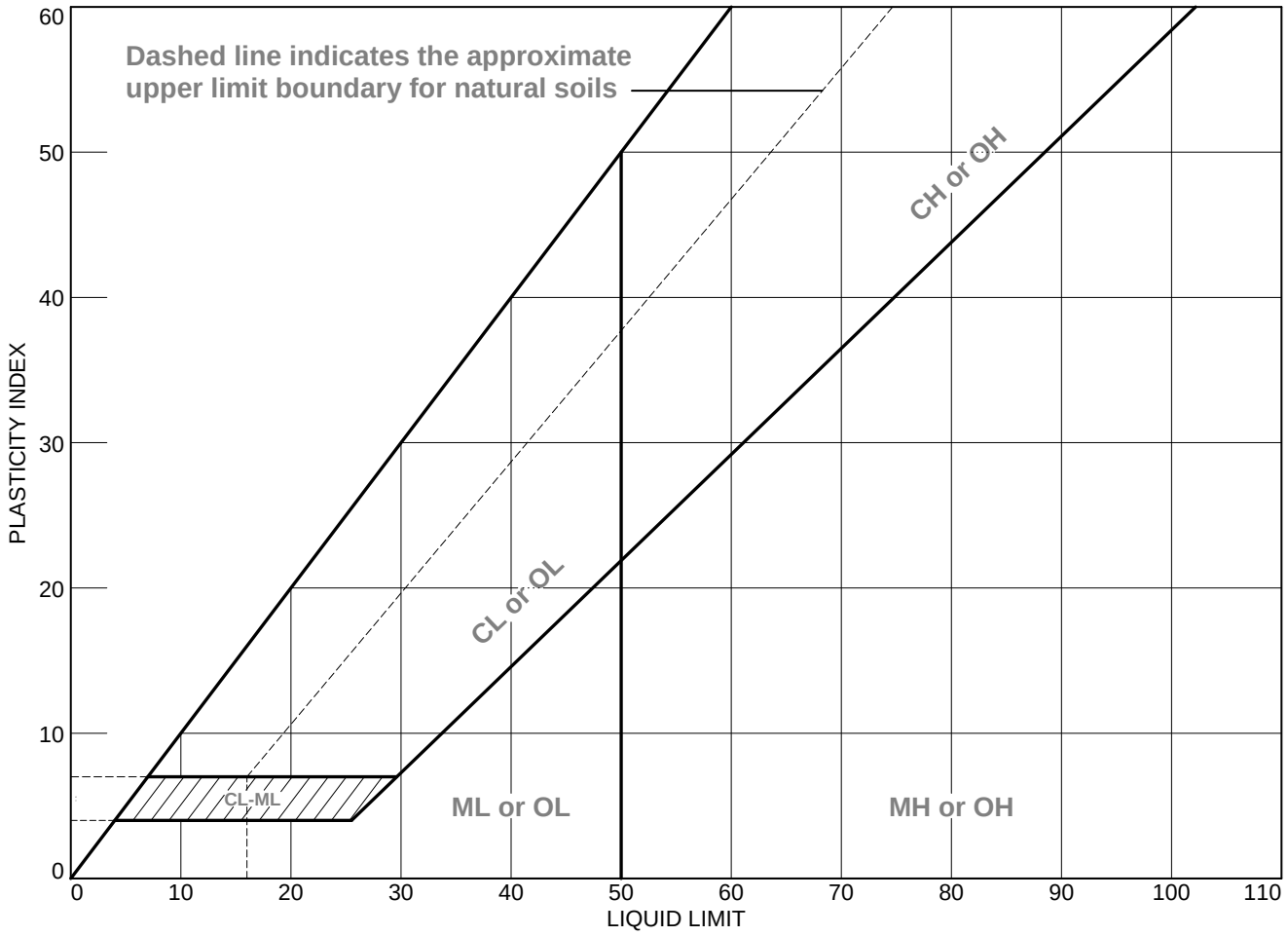
SITE **Plant Scholz Ash Pond** TOTAL DEPTH 50' SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
26									
27									
28									
29									
30		light grey to tan slightly clayey SILT (ML)		28.5-30	10-23-20	43			
31									
32									
33									
34									
35		white to bluish Clay to silty CLAY (CL)		33.5-35	9-50/2	ref			
36									
37									
38									
39									
40		white CLAY w/ rock fragments (CL)		38.5-40	50/1	ref			
41									
42									
43									
44									
45		white clayey SILT few fine sand (ML)		43.5-45	10-11-20	31			
46									
47									
48									
49									
50		white clayey SILT few fine sand (ML)		48.5-50	50/2	ref			
51									
52		Boring terminated @ 50'							
53									
54									
55									
56									
57									

Form GS9901 7-26-2004

ATTACHMENT D

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-1	11	44.5ft. - 46ft.	23.5	NP	NV	NP	ML

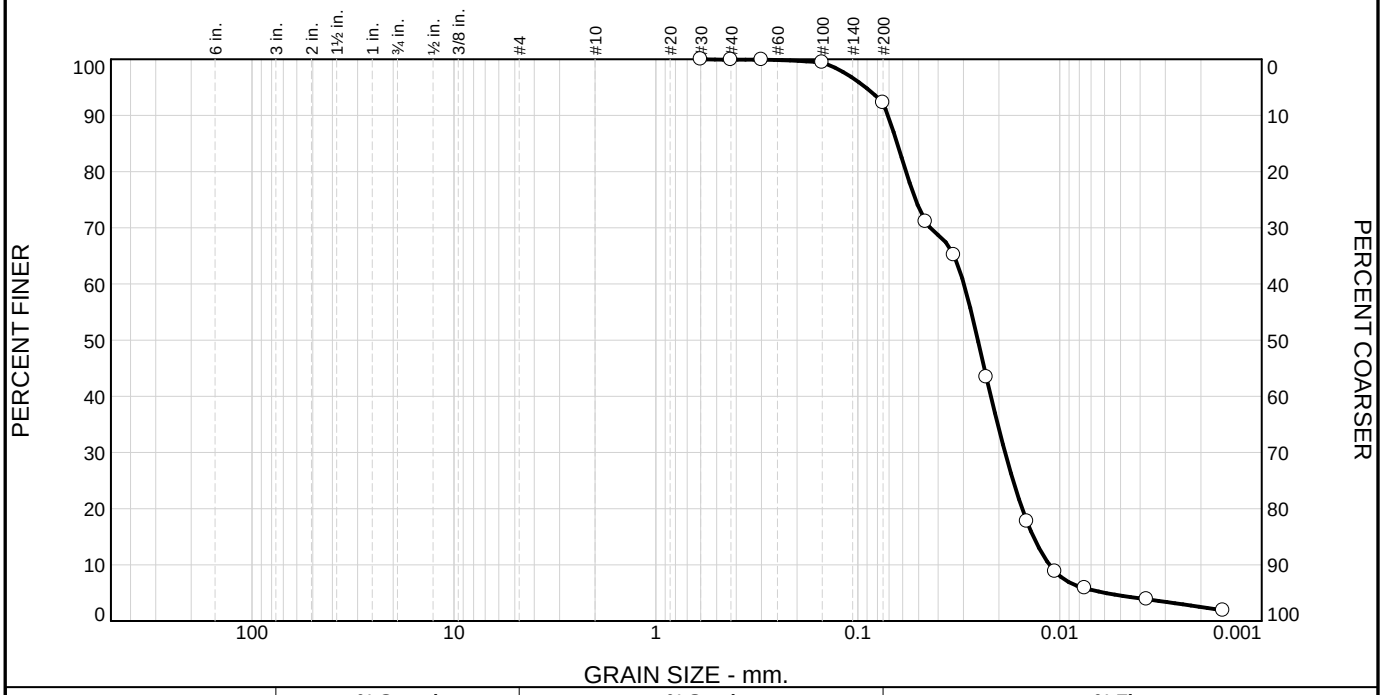
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09890

Tested By: J.Strother (5-6-2010) **Checked By:** D.Wilson (5-25-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	7.6	87.8	4.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#30	100.0		
#40	99.9		
#50	99.9		
#100	99.4		
#200	92.3		
0.0461 mm.	71.1		
0.0335 mm.	65.2		
0.0231 mm.	43.4		
0.0145 mm.	17.7		
0.0106 mm.	8.8		
0.0075 mm.	5.9		
0.0037 mm.	3.9		
0.0016 mm.	1.9		

* (no specification provided)

Material Description

Black SILT

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0710 D_{85}= 0.0638 D_{60}= 0.0298
D_{50}= 0.0254 D_{30}= 0.0187 D_{15}= 0.0135
D_{10}= 0.0112 C_u= 2.65 C_c= 1.04

Remarks

F.M.=0.01

Date Received: 03-30-10 **Date Tested:** 05-7-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-1 **Depth:** 44.5ft. - 46ft. **Date Sampled:** NA

Sample Number: 11

Alabama Power Co.

Birmingham, Alabama

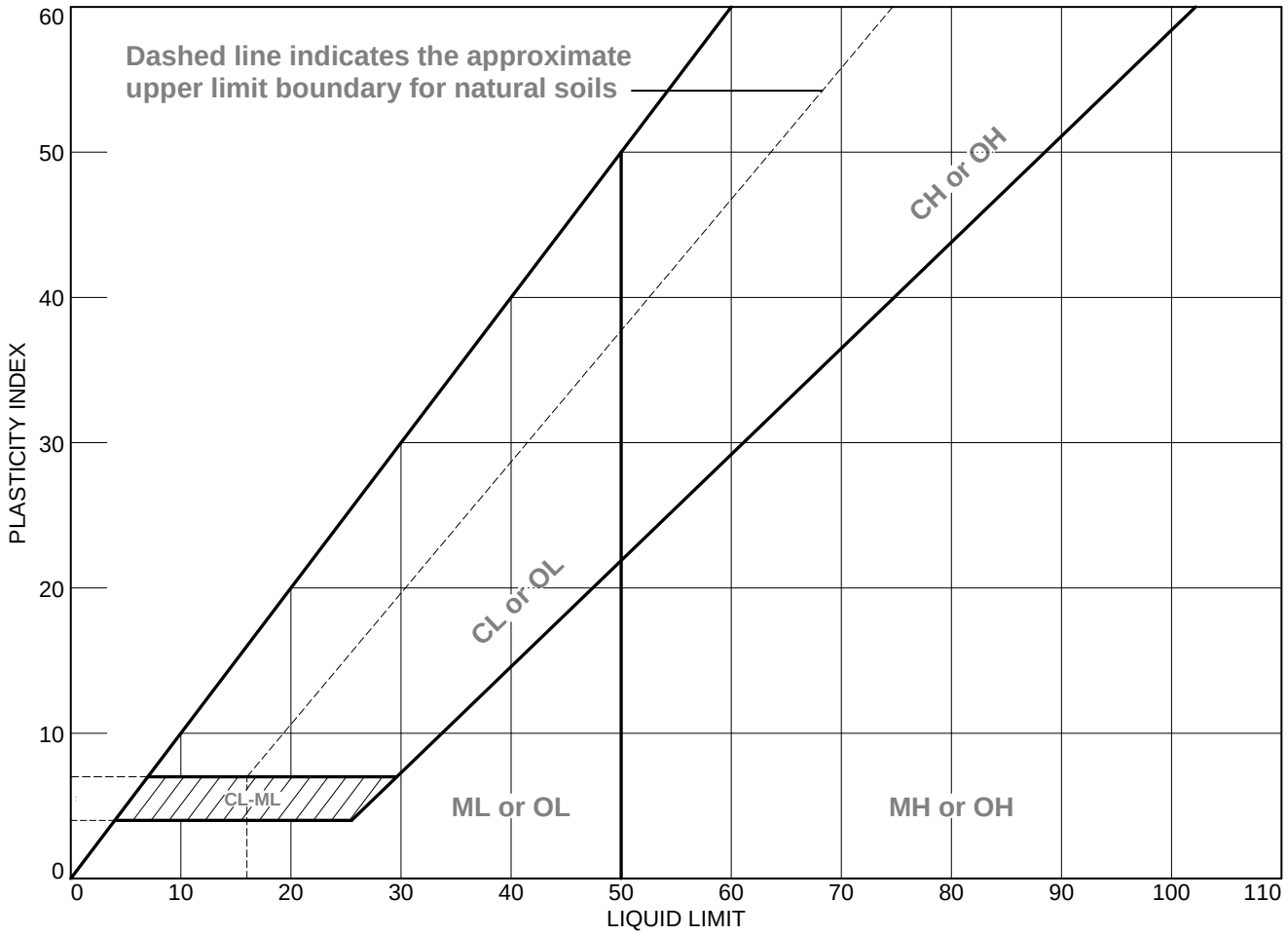
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09890

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-1	12	49.5ft. - 51.0ft.	16.4	NP	NV	NP	SM

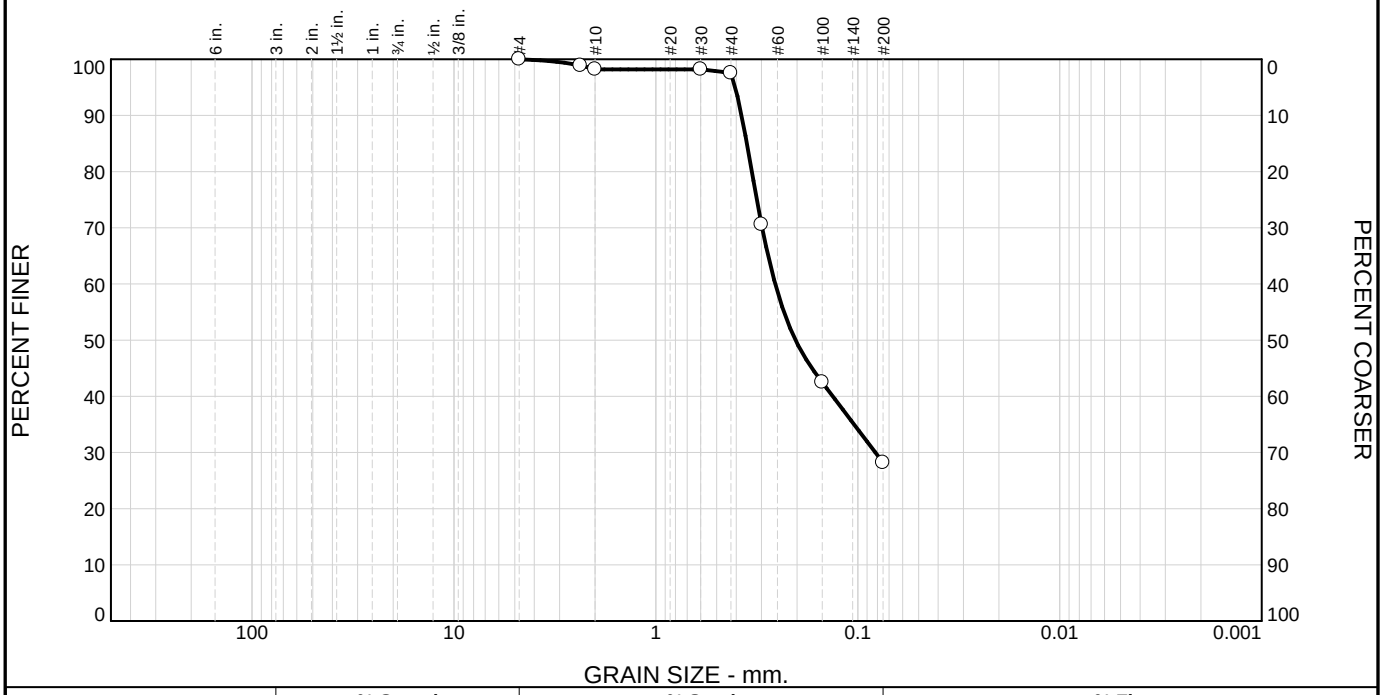
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09891

Tested By: J.Strother (5-6-2010) **Checked By:** D.Wilson (5-25-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.8	0.7	69.3	28.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	98.9		
#10	98.2		
#30	98.2		
#40	97.5		
#50	70.6		
#100	42.5		
#200	28.2		

* (no specification provided)

Material Description

Grayish tan SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.3766 D_{85}= 0.3544 D_{60}= 0.2565
D_{50}= 0.2035 D_{30}= 0.0819 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.92

Date Received: 03-31-2010 **Date Tested:** 05-7-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-1 **Depth:** 49.5ft. - 51.0ft. **Date Sampled:** NA

Sample Number: 12

Alabama Power Co.

Birmingham, Alabama

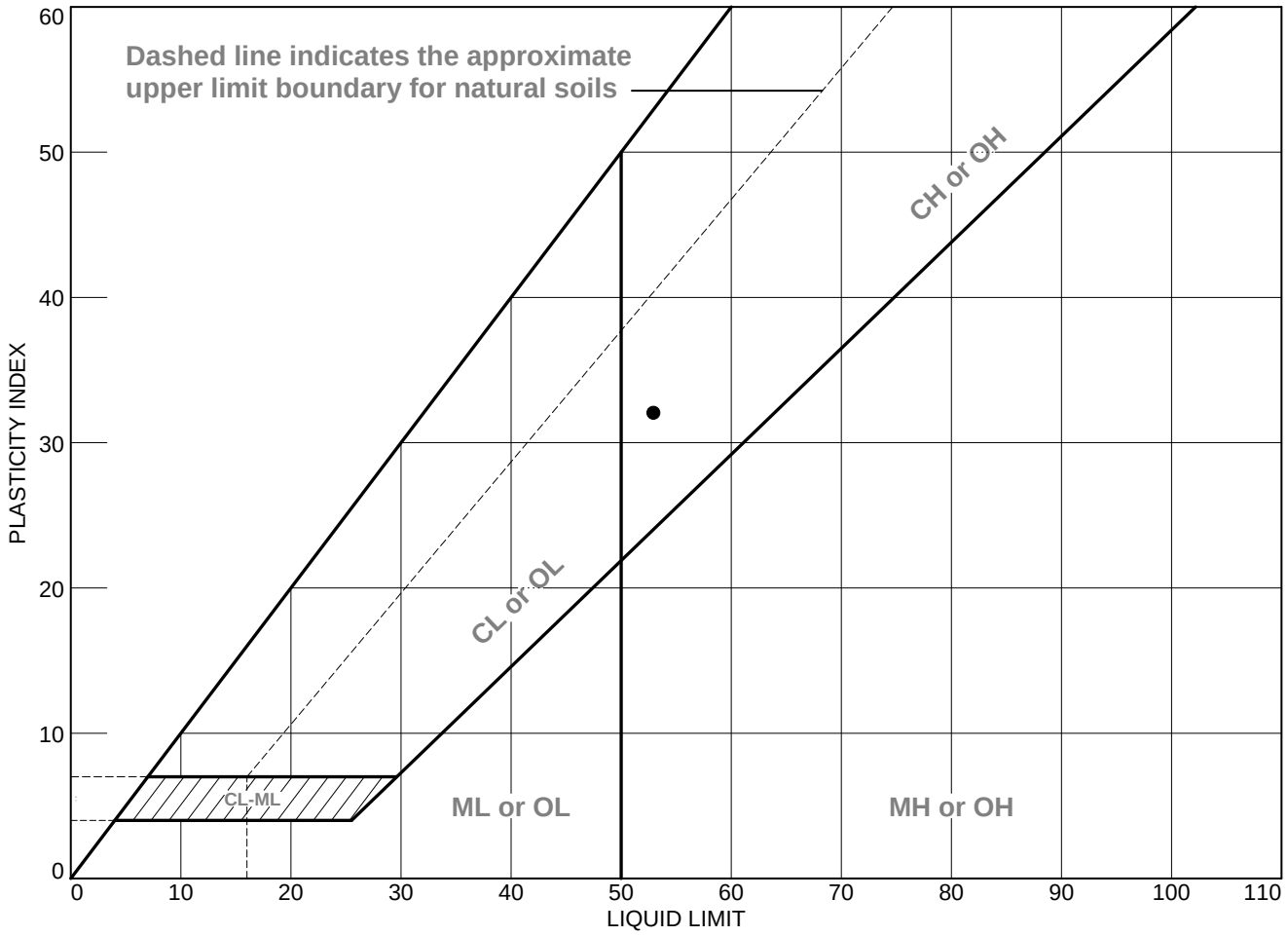
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09891

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-1	14	59.5ft. - 61ft.	33.0	21	53	32	SC

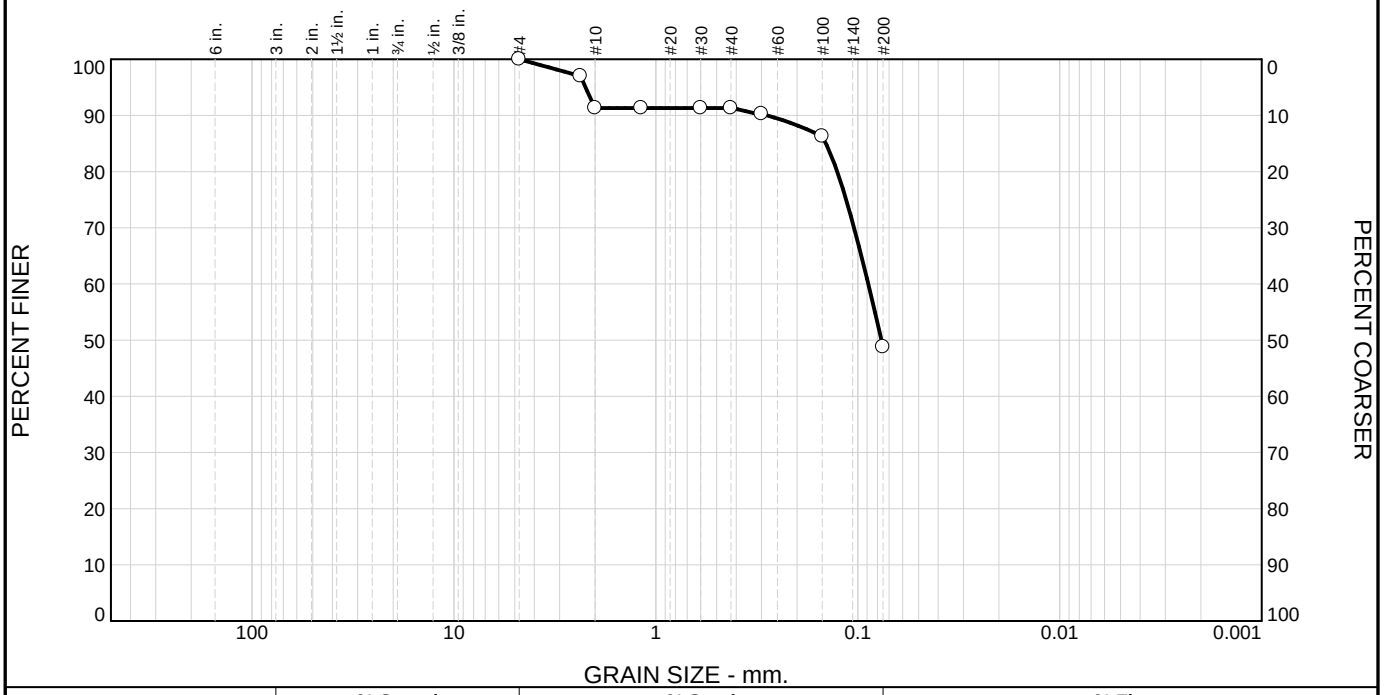
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09892

Tested By: J.Strother (5-6-2010) **Checked By:** D.Wilson (5-25-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	8.7	0.0	42.5	48.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	97.0		
#10	91.3		
#16	91.3		
#30	91.3		
#40	91.3		
#50	90.3		
#100	86.3		
#200	48.8		

* (no specification provided)

Material Description

Grayish tan CLAYEY SAND

Atterberg Limits (ASTM D 4318)

PL= 21 **LL=** 53 **PI=** 32

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-7-6(11)

Coefficients

D_{90}= 0.2816 D_{85}= 0.1437 D_{60}= 0.0888
D_{50}= 0.0764 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.44

Date Received: 3/30/2010 **Date Tested:** 05/07/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-1 **Depth:** 59.5ft. - 61ft. **Date Sampled:** NA

Sample Number: 14

Alabama Power Co.

Birmingham, Alabama

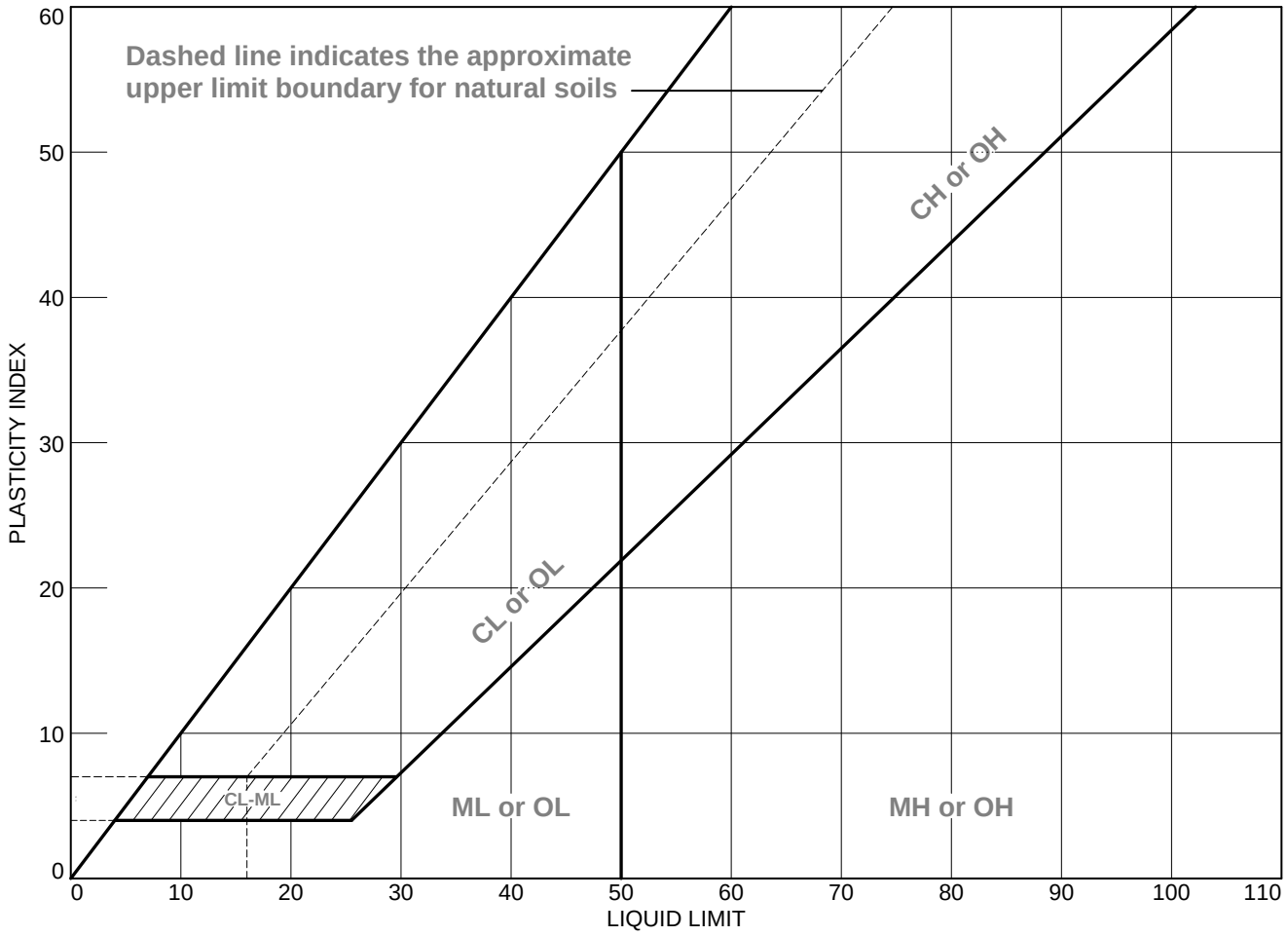
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09892

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-2	7	24.5ft. - 26.0ft.	36.6	NP	NV	NP	ML

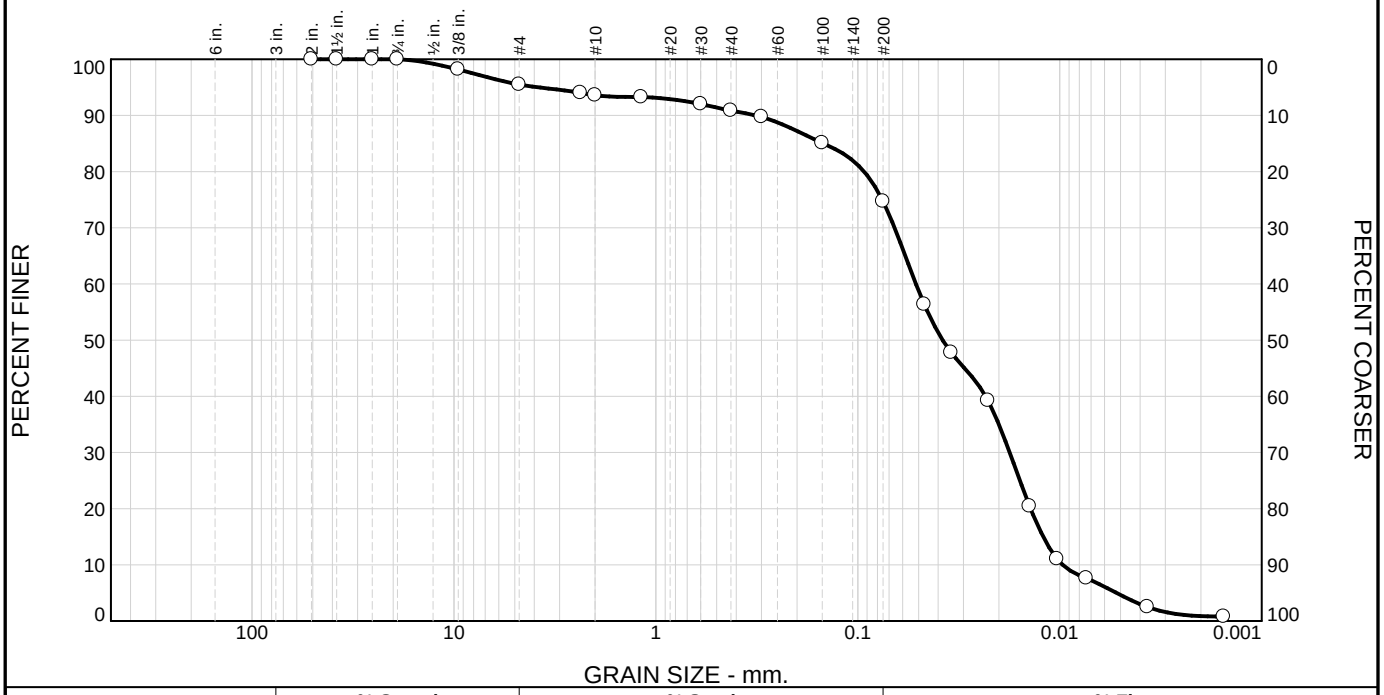
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09893

Tested By: J.Strother (5-6-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.5	1.9	2.7	16.2	70.1	4.6

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	98.2		
#4	95.5		
#8	94.0		
#10	93.6		
#16	93.3		
#30	92.0		
#40	90.9		
#50	89.7		
#100	85.1		
#200	74.7		
0.0468 mm.	56.4		
0.0345 mm.	47.8		
0.0227 mm.	39.3		
0.0141 mm.	20.4		
0.0103 mm.	11.0		
0.0074 mm.	7.6		
0.0037 mm.	2.5		
0.0015 mm.	0.8		

* (no specification provided)

Material Description

Blackish gray SILT with SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.3210 D_{85}= 0.1481 D_{60}= 0.0515
D_{50}= 0.0380 D_{30}= 0.0177 D_{15}= 0.0121
D_{10}= 0.0097 C_u= 5.32 C_c= 0.63

Remarks

F.M.=0.52

Date Received: 03/30/2010 **Date Tested:** 05/07/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-2 **Depth:** 24.5ft. - 26.0ft. **Date Sampled:** NA

Sample Number: 7

Alabama Power Co.

Birmingham, Alabama

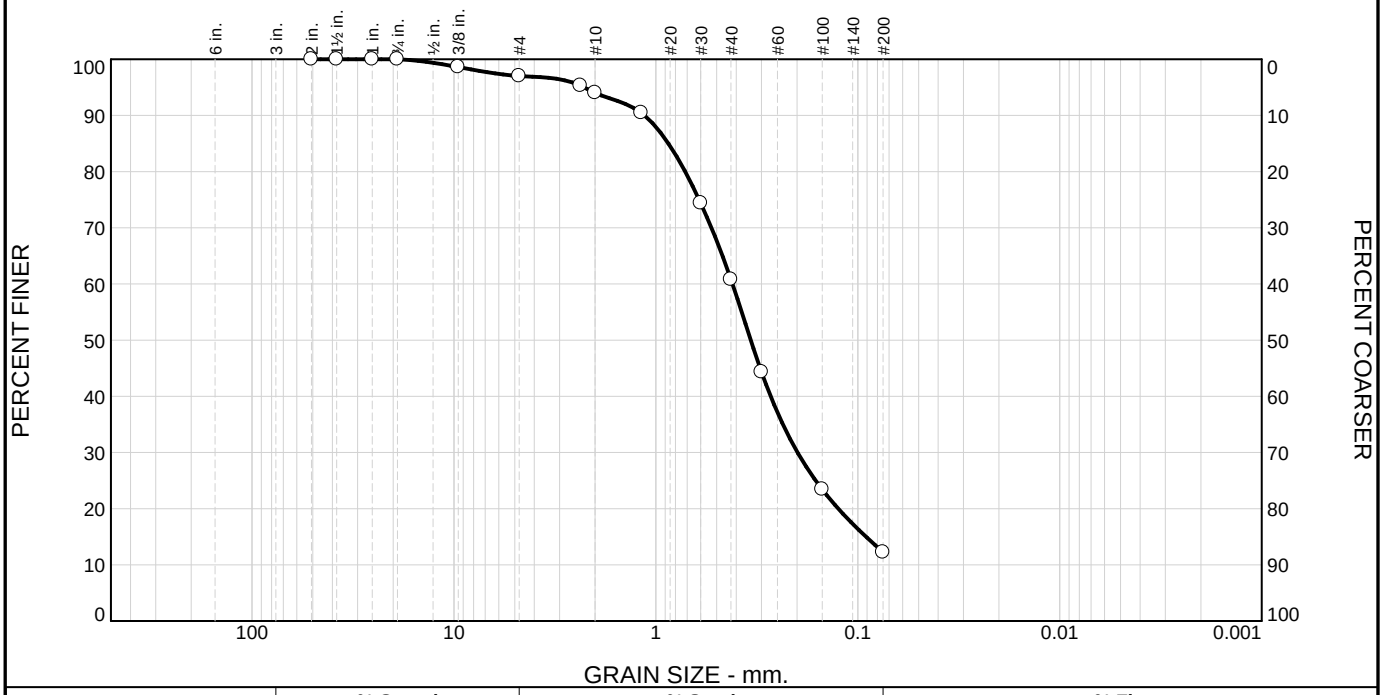
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09893

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.0	3.0	33.2	48.6	12.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	98.6		
#4	97.0		
#8	95.3		
#10	94.0		
#16	90.4		
#30	74.4		
#40	60.8		
#50	44.3		
#100	23.4		
#200	12.2		

* (no specification provided)

Material Description

Brownish black SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 1.1392 D_{85}= 0.8669 D_{60}= 0.4176
D_{50}= 0.3392 D_{30}= 0.1988 D_{15}= 0.0910
D_{10}= C_u= C_c=

Remarks

%Moist = 15.8
F.M.=1.77

Date Received: 03/30/2010 **Date Tested:** 04/27/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-2 **Depth:** 44.5ft. - 46ft. **Date Sampled:** NA

Sample Number: 11

Alabama Power Co.

Birmingham, Alabama

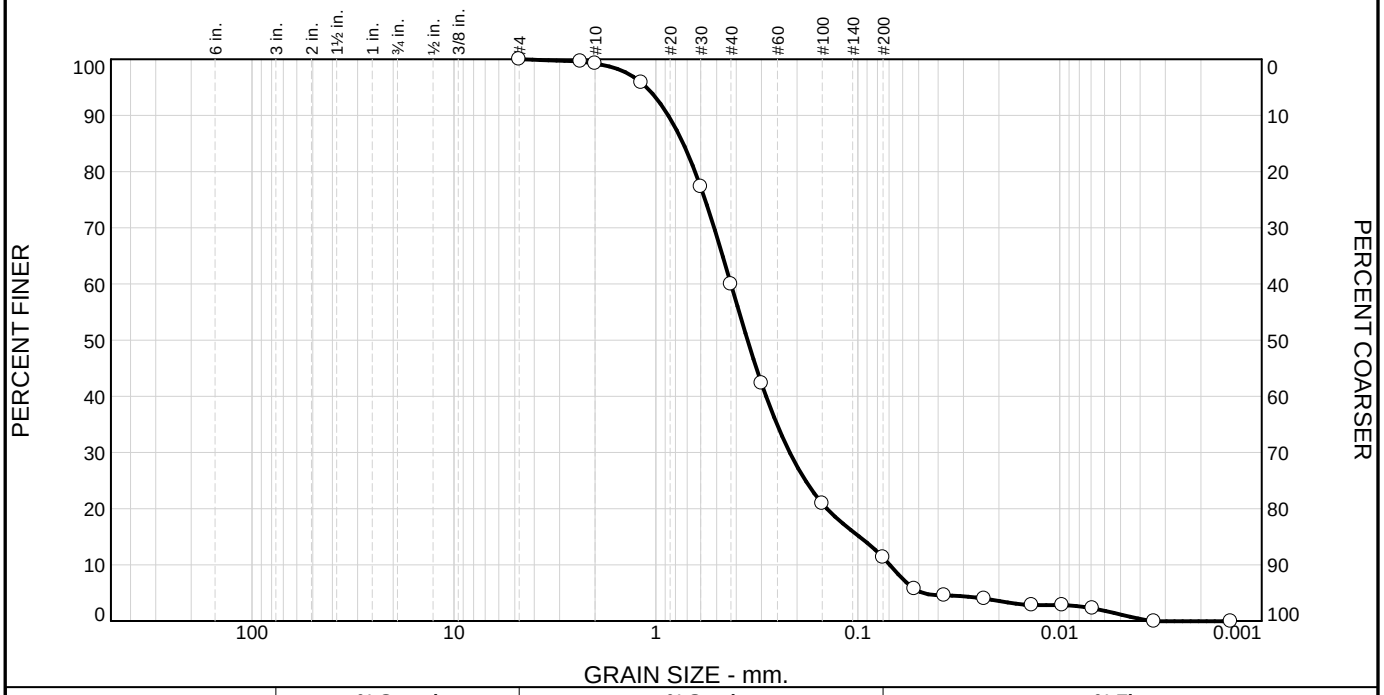
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09894

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.8	39.2	48.7	10.1	1.2

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.6		
#10	99.2		
#16	95.8		
#30	77.3		
#40	60.0		
#50	42.3		
#100	20.9		
#200	11.3		
0.0525 mm.	5.7		
0.0373 mm.	4.6		
0.0237 mm.	4.0		
0.0137 mm.	2.8		
0.0097 mm.	2.8		
0.0069 mm.	2.3		
0.0034 mm.			
0.0014 mm.			

* (no specification provided)

Material Description

Black tan well-graded SAND with SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= SW-SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.8682 D_{85}= 0.7325 D_{60}= 0.4253
D_{50}= 0.3517 D_{30}= 0.2172 D_{15}= 0.0981
D_{10}= 0.0694 C_u= 6.13 C_c= 1.60

Remarks

%Moist = 39.2
F.M.=1.64

Date Received: 03/30/2010 **Date Tested:** 05/07/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-3 **Depth:** 39.5ft. - 41.0ft. **Date Sampled:** NA

Sample Number: 10

Alabama Power Co.

Birmingham, Alabama

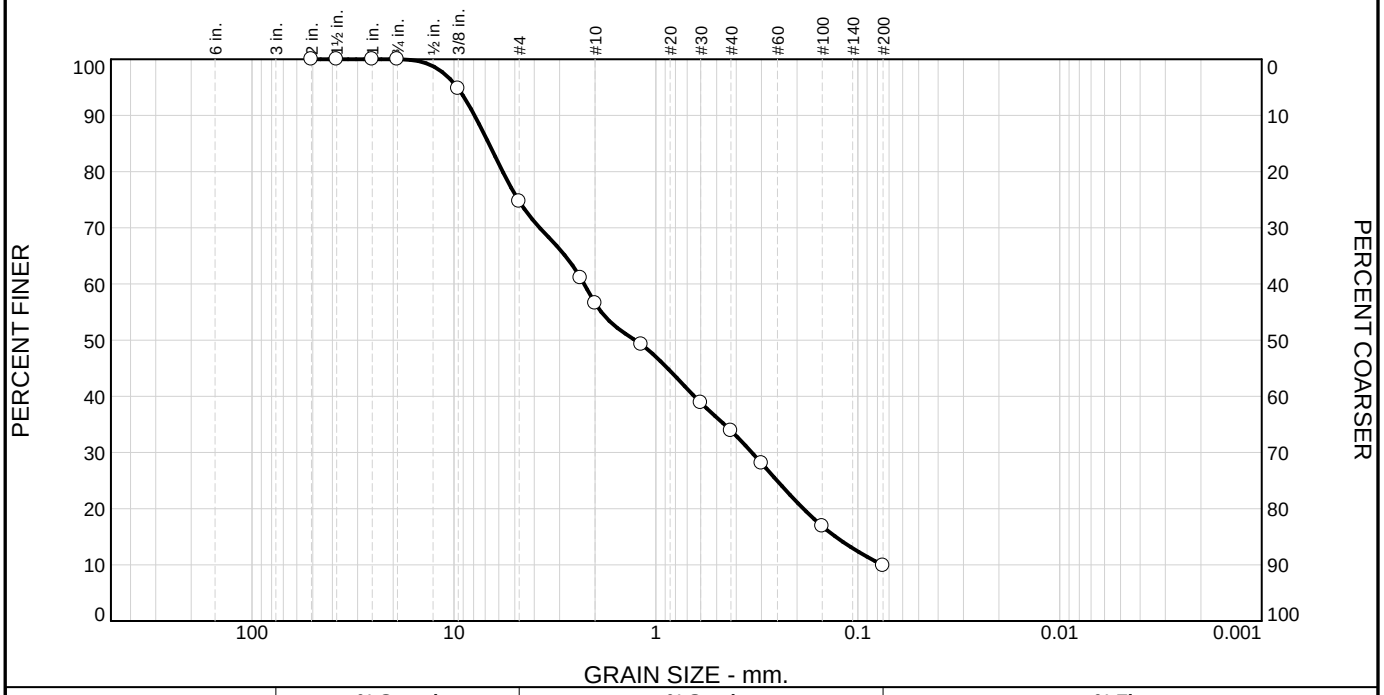
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09895

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	25.3	18.1	22.7	24.0	9.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	94.8		
#4	74.7		
#8	61.1		
#10	56.6		
#16	49.2		
#30	38.9		
#40	33.9		
#50	28.1		
#100	16.9		
#200	9.9		

* (no specification provided)

Material Description

Gray poorly graded SAND with SILT and GRAVEL

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 7.9049 D_{85}= 6.7215 D_{60}= 2.2670
D_{50}= 1.2664 D_{30}= 0.3350 D_{15}= 0.1288
D_{10}= 0.0762 C_u= 29.76 C_c= 0.65

Remarks

%Moist = 13.8
F.M.=3.36

Date Received: 03/30/2010 **Date Tested:** 04/27/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-3 **Depth:** 49.5ft. - 51.0ft. **Date Sampled:** NA

Sample Number: 12

Alabama Power Co.

Birmingham, Alabama

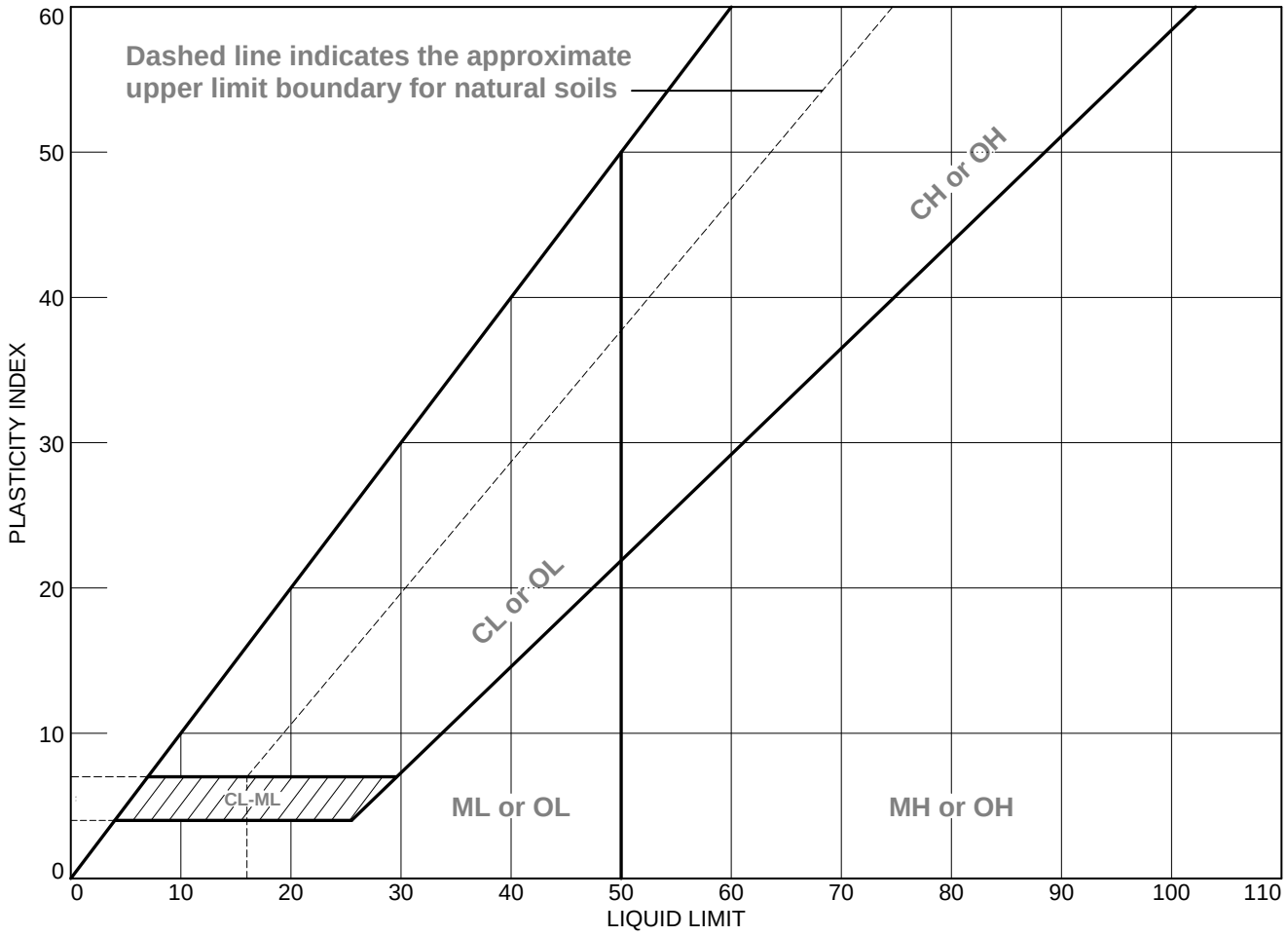
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09896

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-4	10	39.5ft. - 41.0ft.	37.2	NP	NV	NP	SM

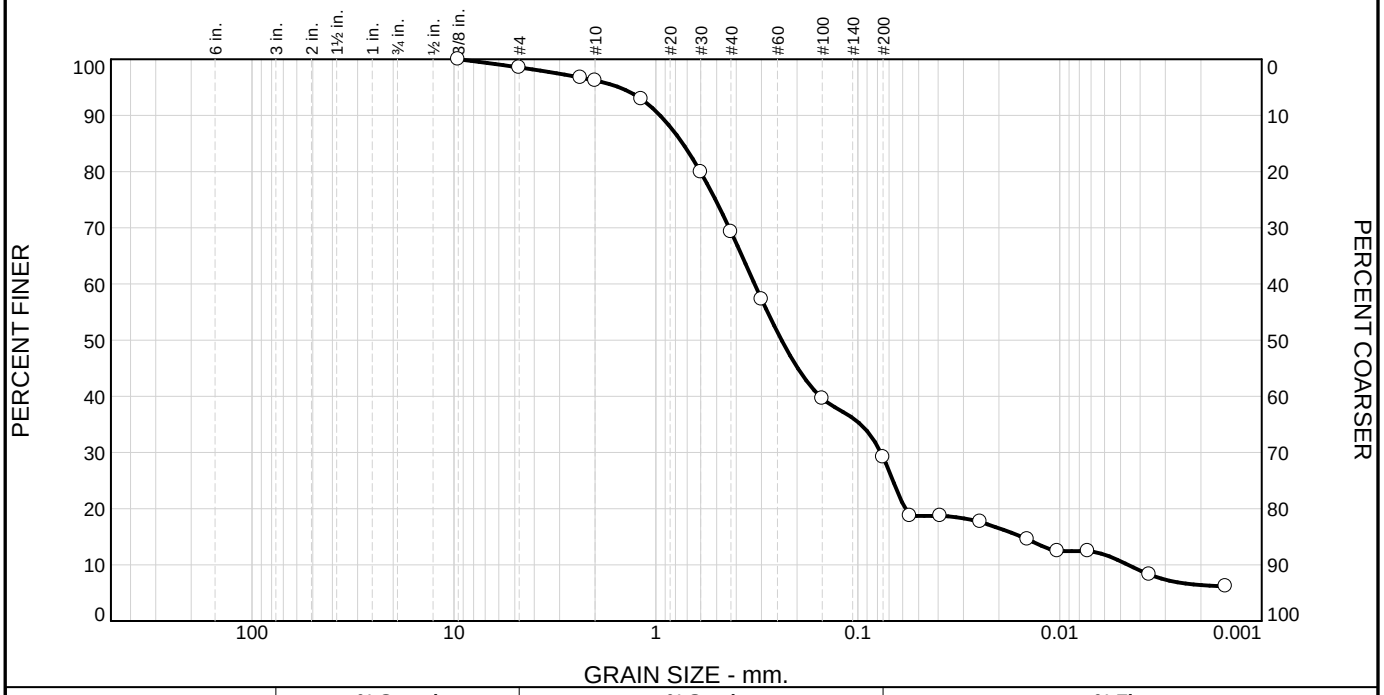
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09897

Tested By: J.Strother (5-6-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.5	2.3	26.9	40.1	18.6	10.6

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	98.5		
#8	96.7		
#10	96.2		
#16	92.9		
#30	79.9		
#40	69.3		
#50	57.3		
#100	39.6		
#200	29.2		
0.0552 mm.	18.7		
0.0391 mm.	18.7		
0.0248 mm.	17.7		
0.0144 mm.	14.5		
0.0103 mm.	12.5		
0.0073 mm.	12.5		
0.0036 mm.	8.3		
0.0015 mm.	6.2		

* (no specification provided)

Material Description

Grayish tan SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.9531 D_{85}= 0.7365 D_{60}= 0.3247
D_{50}= 0.2385 D_{30}= 0.0769 D_{15}= 0.0154
D_{10}= 0.0046 C_u= 70.84 C_c= 3.98

Remarks

F.M.=1.35

Date Received: 03-30-2010 **Date Tested:** 05-7-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-4 **Depth:** 39.5ft. - 41.0ft. **Date Sampled:** NA

Sample Number: 10

Alabama Power Co.

Birmingham, Alabama

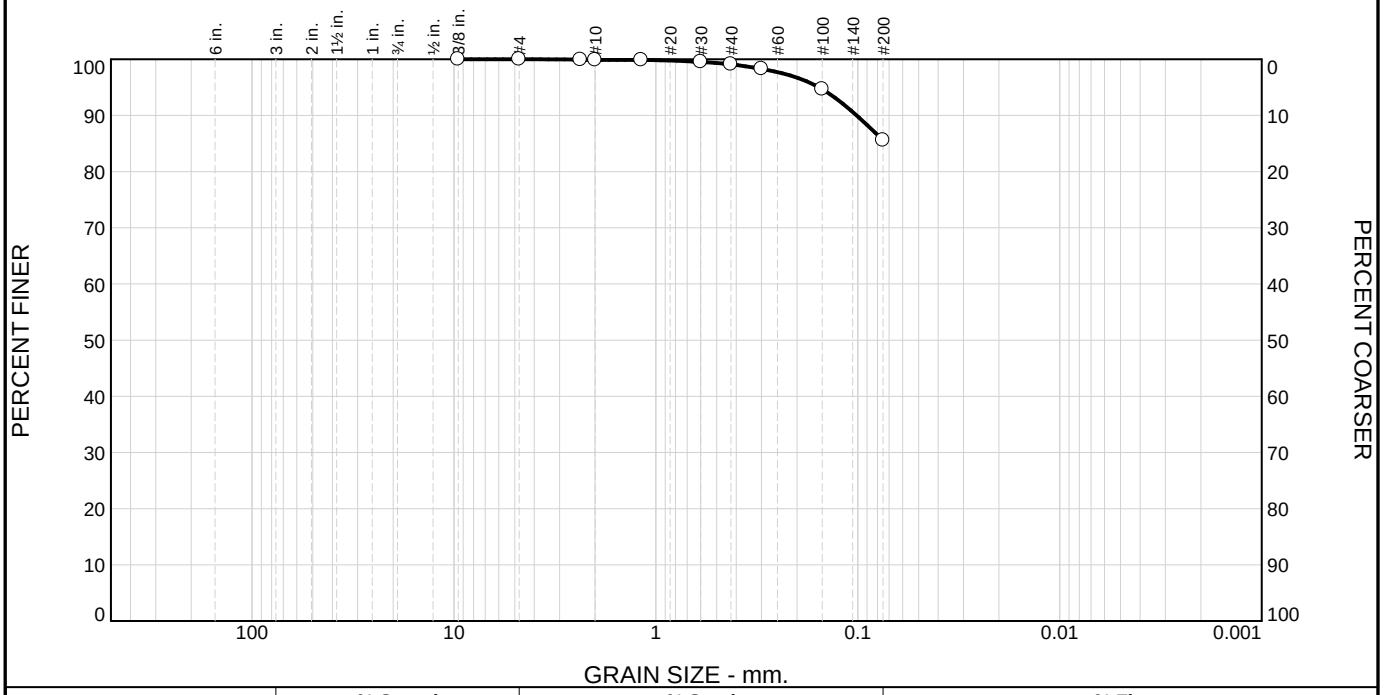
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09897

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.8	13.5	85.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.9		
#30	99.5		
#40	99.1		
#50	98.3		
#100	94.7		
#200	85.6		

* (no specification provided)

Material Description

Gray SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.1014 D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

%Moisture = 48.8
F.M.=0.08

Date Received: 03/30/2010 **Date Tested:** 04/27/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-5 **Depth:** 29.5ft. - 31.0ft. **Date Sampled:** NA
Sample Number: 8

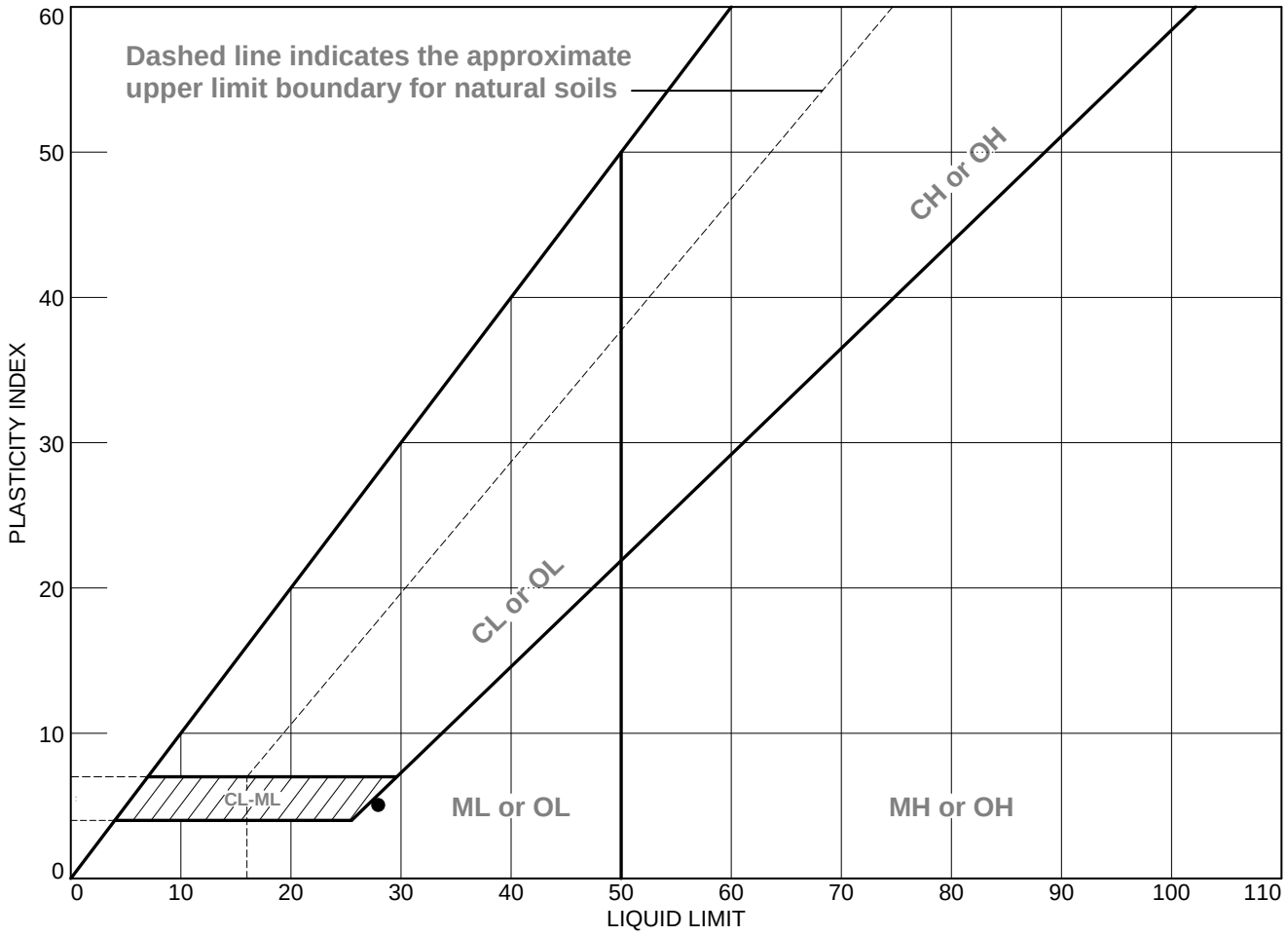
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond

Project No: **Lab #** AP09898

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-5	10	39.5ft. - 41.0	14.8	23	28	5	SP-SM

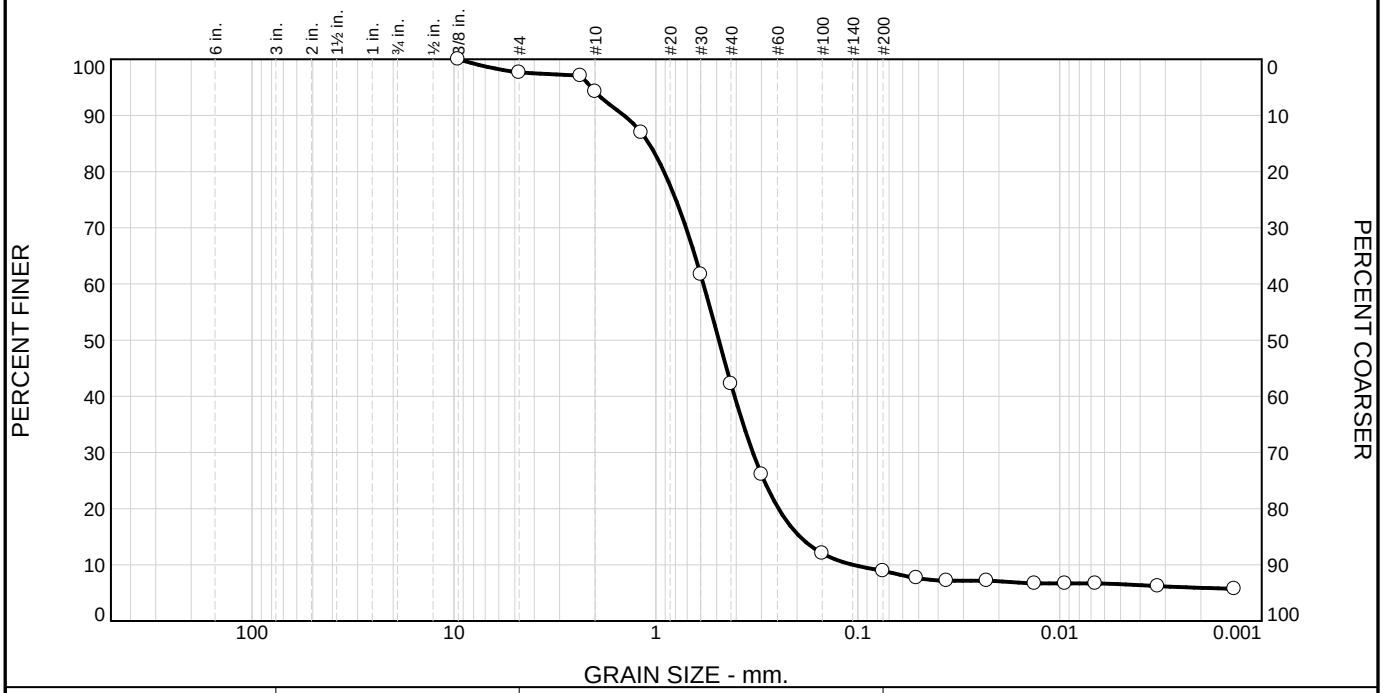
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09899

Tested By: J.Strother (5-6-2010) **Checked By:** D.Wilson (5-25-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.4	3.4	52.0	33.3	2.4	6.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	97.6		
#8	97.1		
#10	94.2		
#16	86.9		
#30	61.7		
#40	42.2		
#50	26.1		
#100	12.0		
#200	8.9		
0.0512 mm.	7.7		
0.0363 mm.	7.2		
0.0230 mm.	7.2		
0.0133 mm.	6.7		
0.0094 mm.	6.7		
0.0067 mm.	6.7		
0.0033 mm.	6.2		
0.0014 mm.	5.7		

* (no specification provided)

Material Description

Brown poorly graded SAND with SILT

Atterberg Limits (ASTM D 4318)

PL= 23 **LL=** 28 **PI=** 5

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 1.4388 D_{85}= 1.0818 D_{60}= 0.5817
D_{50}= 0.4878 D_{30}= 0.3311 D_{15}= 0.1932
D_{10}= 0.1057 C_u= 5.50 C_c= 1.78

Remarks

F.M.=2.19

Date Received: 03-30-2010 **Date Tested:** 05-7-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-5 **Depth:** 39.5ft. - 41.0 **Date Sampled:** NA

Sample Number: 10

Alabama Power Co.

Birmingham, Alabama

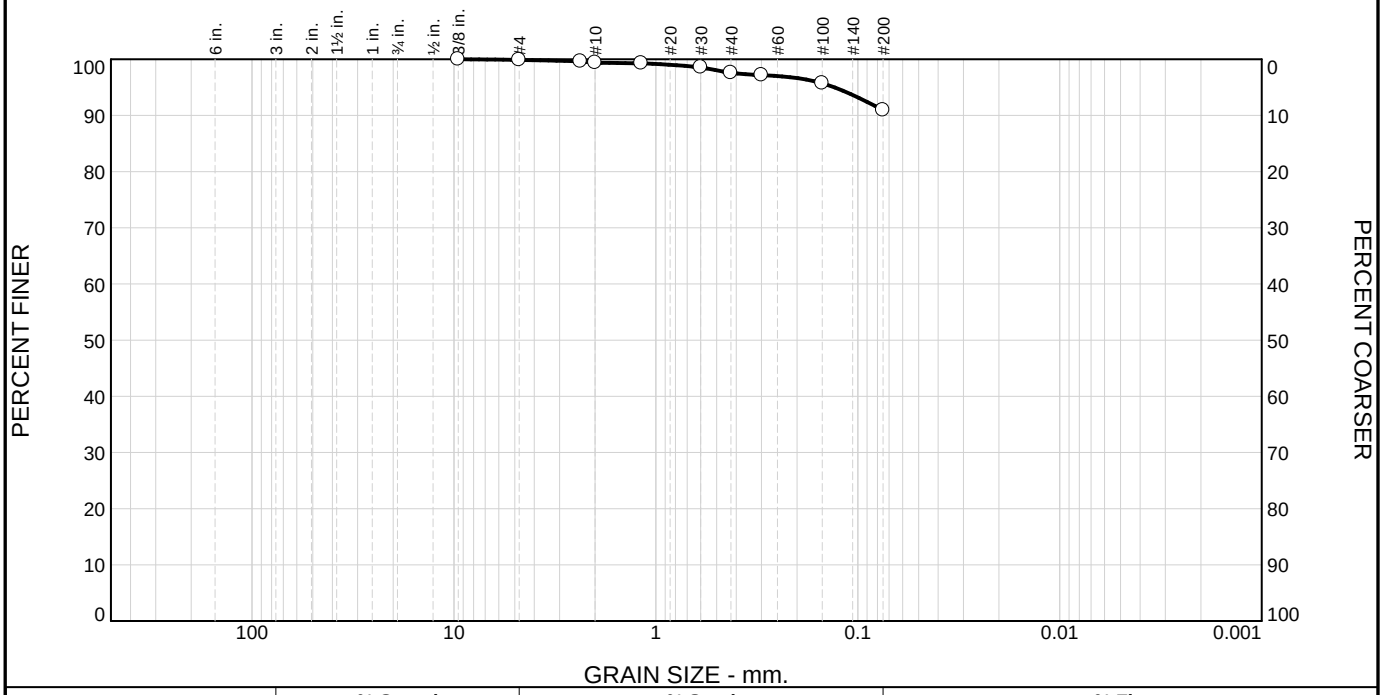
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09899

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.5	1.8	6.7	90.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	99.9		
#8	99.6		
#10	99.4		
#16	99.3		
#30	98.6		
#40	97.6		
#50	97.2		
#100	95.7		
#200	90.9		

* (no specification provided)

Material Description

Tannish black SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

%MOIST = 22.2
F.M.=0.10

Date Received: 03-31-2010 **Date Tested:** 05-7-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: 05-25-2010

Source of Sample: EDB-5 **Depth:** 44.5ft. - 46.0ft. **Date Sampled:** NA

Sample Number: 11

Alabama Power Co.

Birmingham, Alabama

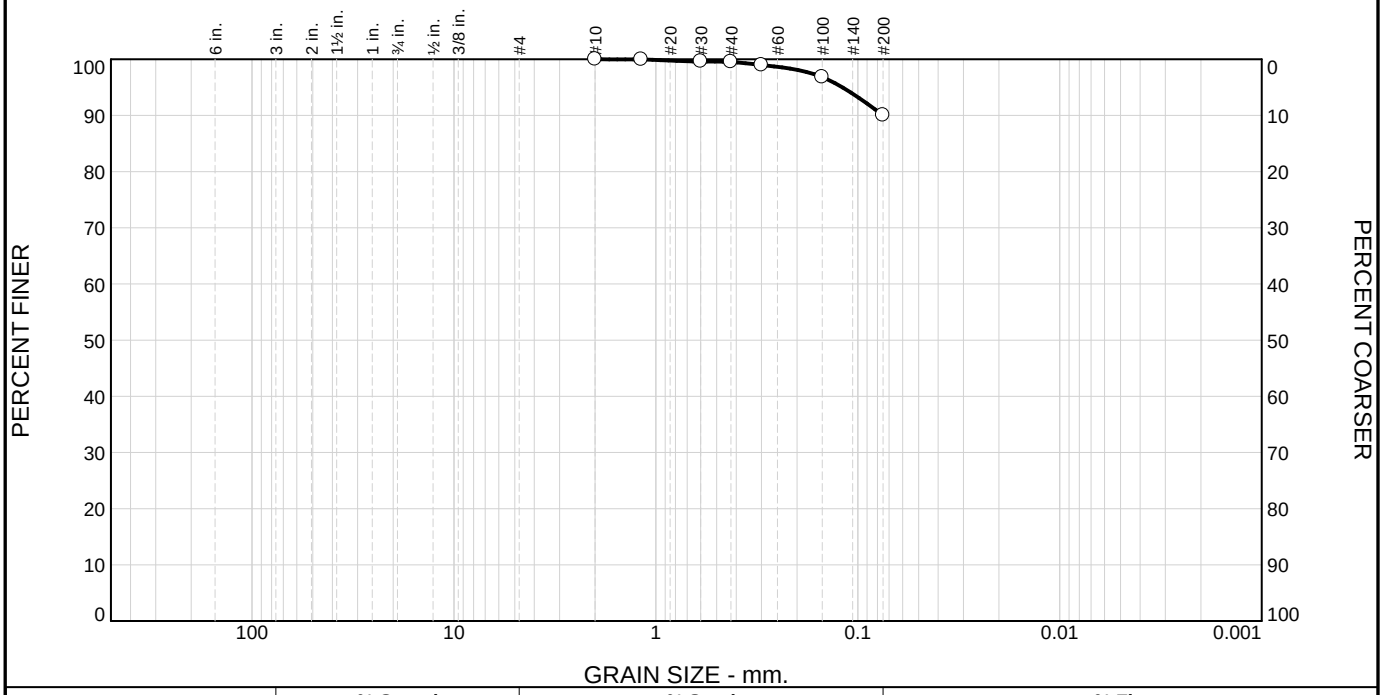
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09900

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	9.5	90.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	100.0		
#30	99.6		
#40	99.5		
#50	99.0		
#100	96.8		
#200	90.0		

* (no specification provided)

Material Description

Gray SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

% MOIST = 66.5
F.M.=0.05

Date Received: 03-30-2010 **Date Tested:** 05-7-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: 05-25-2010

Source of Sample: EDB-6 **Depth:** 7.5 - 9.0 **Date Sampled:** NA

Sample Number: 3

Alabama Power Co.

Birmingham, Alabama

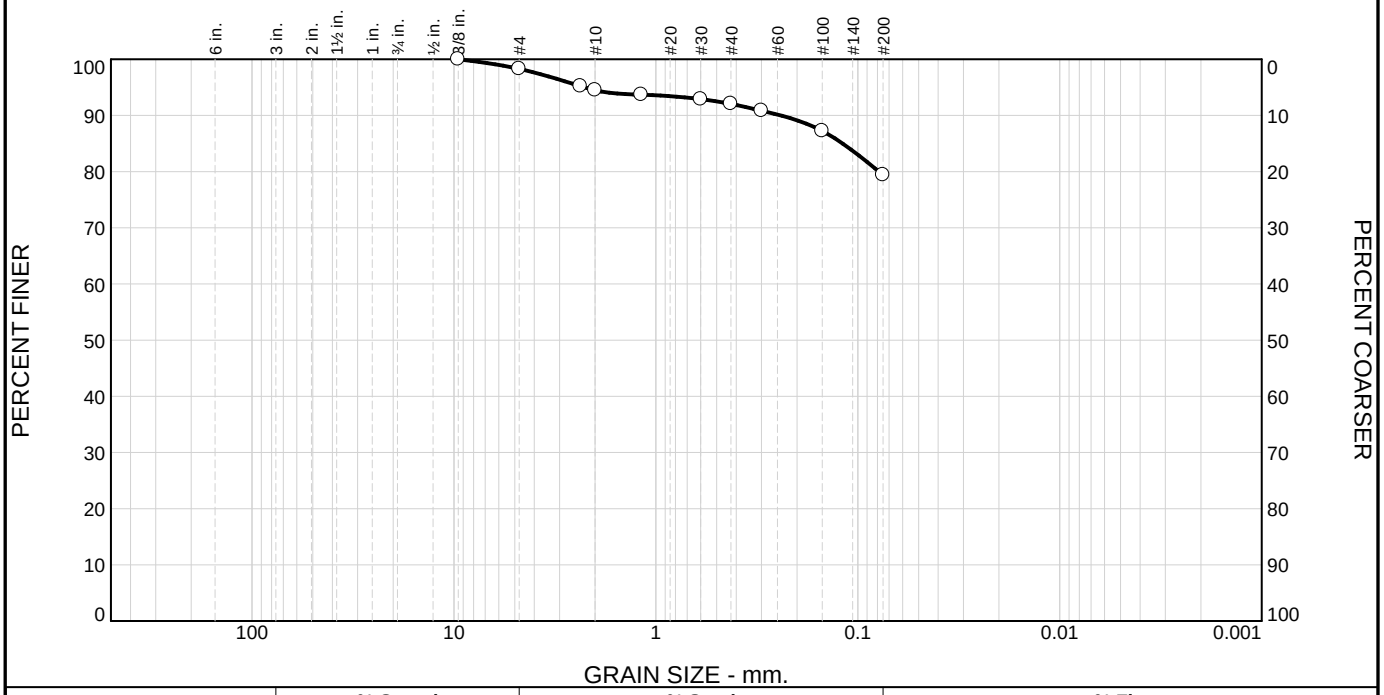
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09901

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	3.8	2.4	12.7	79.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	98.3		
#8	95.2		
#10	94.5		
#16	93.7		
#30	92.9		
#40	92.1		
#50	90.8		
#100	87.2		
#200	79.4		

* (no specification provided)

Material Description

Black SILT with SAND

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.2410 D_{85}= 0.1189 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

% Moist = 38.4
F.M.=0.42

Date Received: 03/30/2010 **Date Tested:** 05/12/2010

Tested By: Joseph Stother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-6 **Depth:** 14.5ft. - 16.0ft. **Date Sampled:** NA
Sample Number: 5

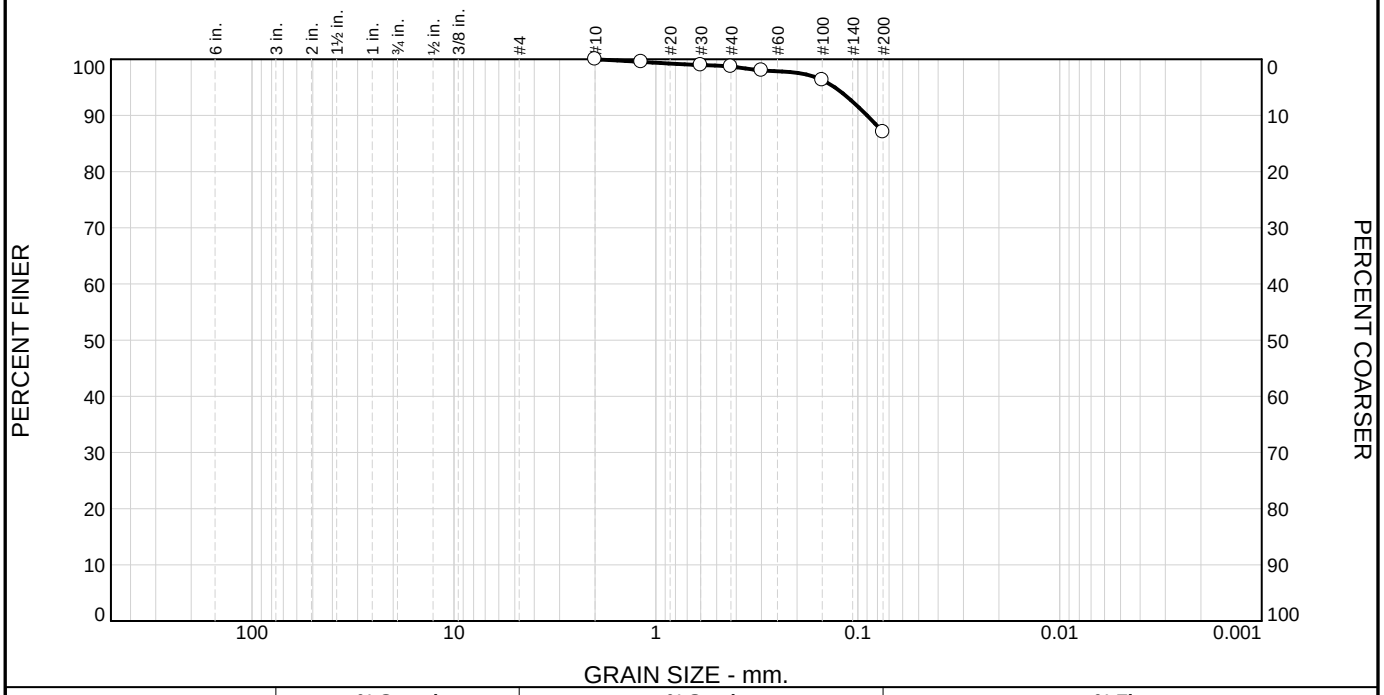
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond

Project No: **Lab #** AP09902

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.3	11.6	87.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.5		
#30	99.0		
#40	98.7		
#50	98.0		
#100	96.3		
#200	87.1		

* (no specification provided)

Material Description

Black SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0901 D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

%Moist = 63.8
F.M.=0.07

Date Received: 03-30-2010 **Date Tested:** 05/12/2010

Tested By: Joseph Stother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB7 **Depth:** 24.5ft. - 26.0ft. **Date Sampled:** NA

Sample Number: 7

Alabama Power Co.

Birmingham, Alabama

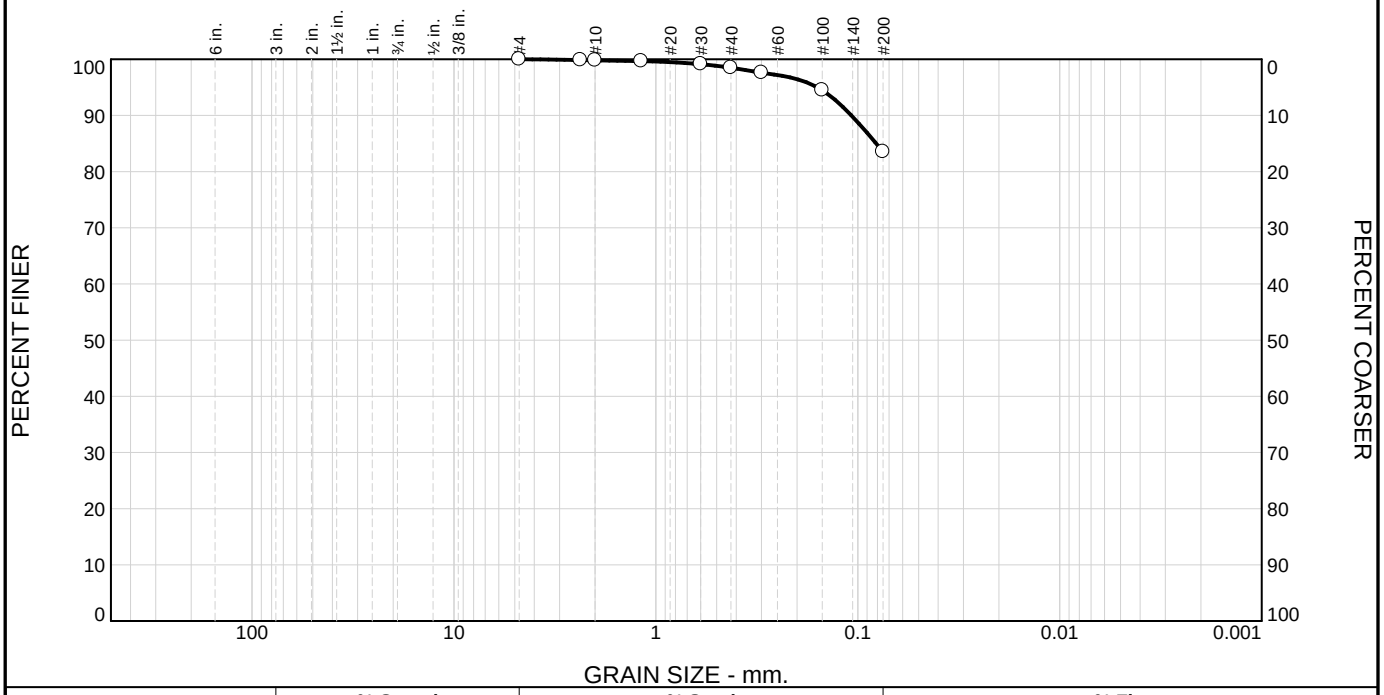
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09903

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	1.3	15.0	83.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.9		
#10	99.8		
#16	99.7		
#30	99.1		
#40	98.5		
#50	97.6		
#100	94.5		
#200	83.5		

* (no specification provided)

Material Description

Black SILT with SAND

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.1076 D_{85}= 0.0812 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

%Moist = 53.2
F.M.=0.09

Date Received: 03/30/2010 **Date Tested:** 05/12/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-7 **Depth:** 29.5ft. - 31.0 ft. **Date Sampled:** NA

Sample Number: 8

Alabama Power Co.

Birmingham, Alabama

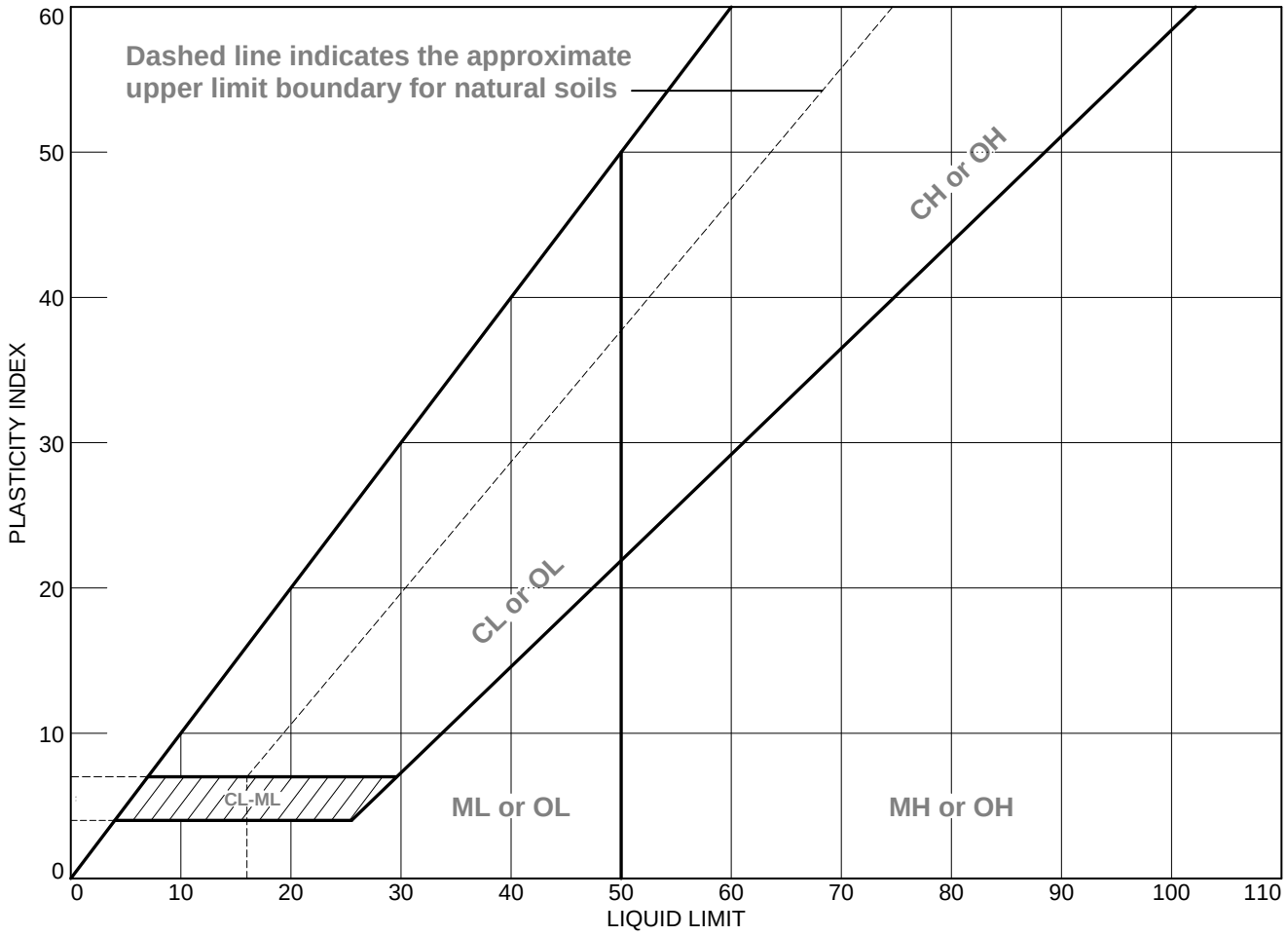
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09904

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-8	6	19.5ft. - 21.0ft.	11.6	NP	NV	NP	SM

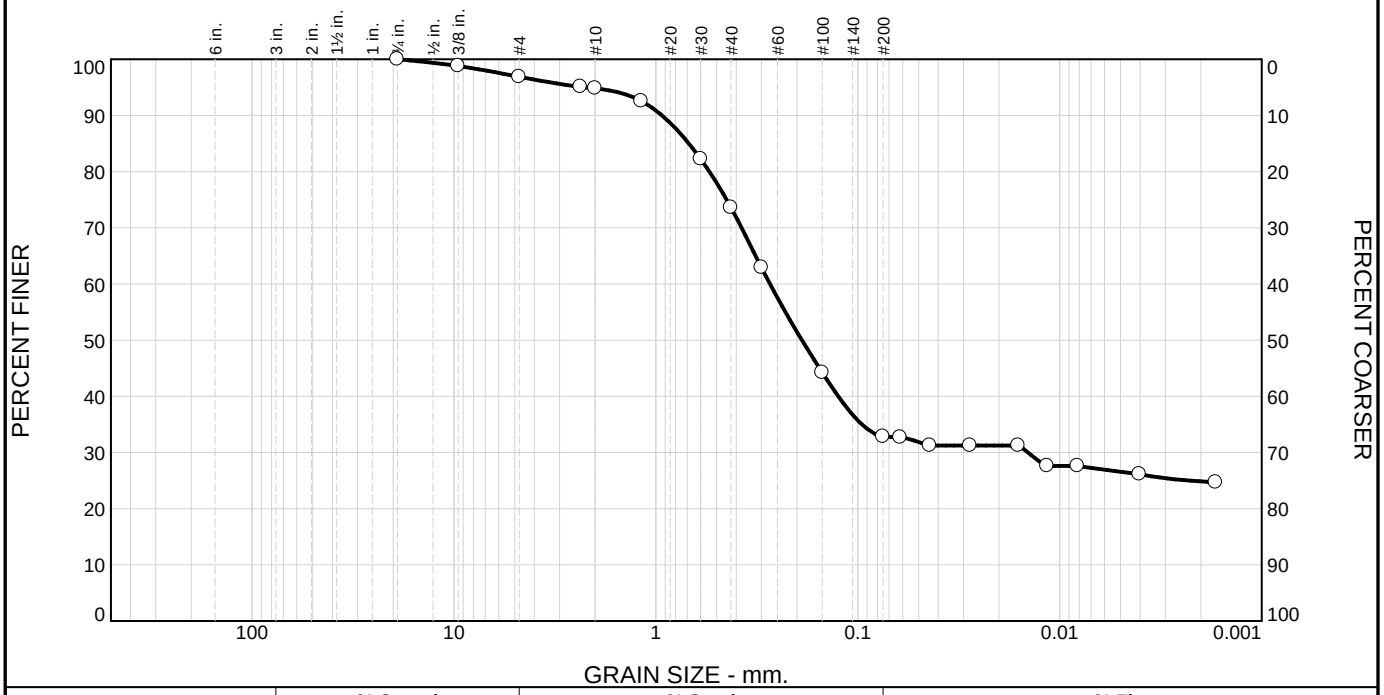
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09906

Tested By: J.Strother (5-6-2010) **Checked By:** D. Wilson (5-6-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.1	2.1	21.2	40.8	6.2	26.6

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75	100.0		
.375	98.8		
#4	96.9		
#8	95.1		
#10	94.8		
#16	92.5		
#30	82.2		
#40	73.6		
#50	62.9		
#100	44.2		
#200	32.8		
0.0617 mm.	32.7		
0.0440 mm.	31.2		
0.0278 mm.	31.2		
0.0161 mm.	31.2		
0.0116 mm.	27.6		
0.0082 mm.	27.6		
0.0040 mm.	26.1		
0.0017 mm.	24.7		

* (no specification provided)

Material Description

Brown SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.9330 D_{85}= 0.6865 D_{60}= 0.2723
D_{50}= 0.1891 D_{30}= 0.0144 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.27

Date Received: 03/30/2010 **Date Tested:** 05/12/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-8 **Depth:** 19.5ft. - 21.0ft. **Date Sampled:** NA

Sample Number: 6

Alabama Power Co.

Birmingham, Alabama

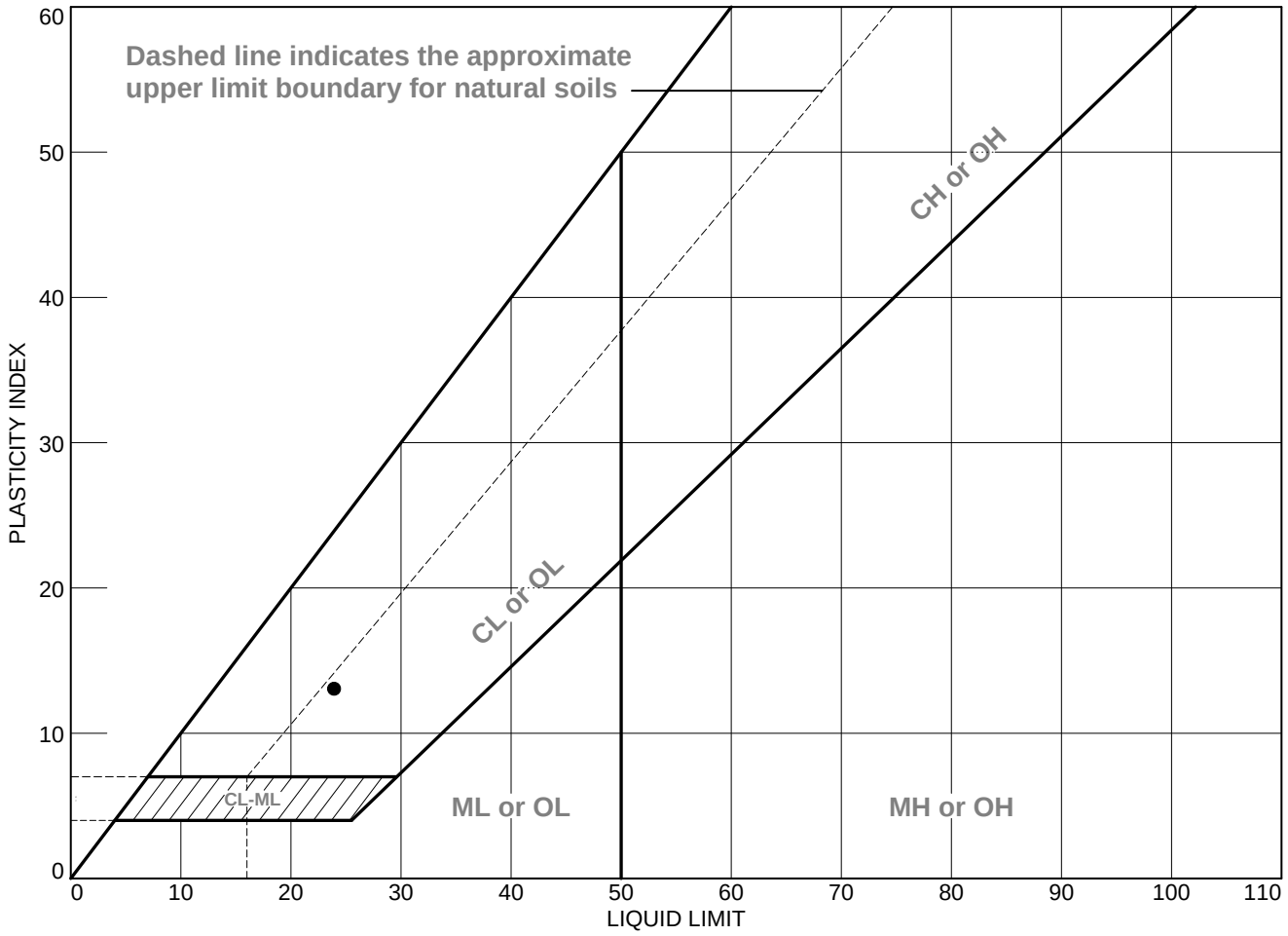
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09906

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-8	7	24.5ft. - 26.0ft.	18.4	11	24	13	SC

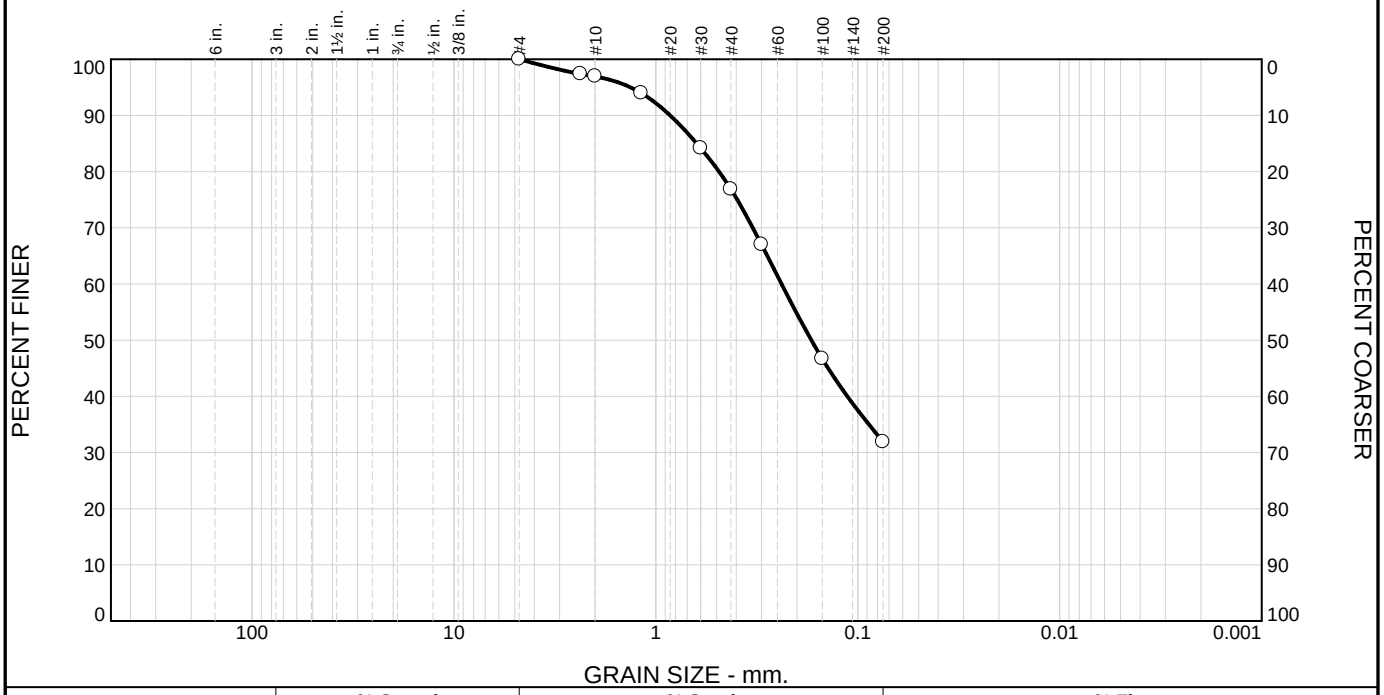
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09909

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	3.1	20.0	45.0	31.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	97.4		
#10	96.9		
#16	94.0		
#30	84.2		
#40	76.9		
#50	67.0		
#100	46.7		
#200	31.9		

* (no specification provided)

Material Description

Brown CLAYEY SAND

Atterberg Limits (ASTM D 4318)

PL= 11 **LL=** 24 **PI=** 13

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-2-6(1)

Coefficients

D_{90}= 0.8498 D_{85}= 0.6276 D_{60}= 0.2386
D_{50}= 0.1699 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.11

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-8 **Depth:** 24.5ft. - 26.0ft. **Date Sampled:** NA

Sample Number: 7

Alabama Power Co.

Birmingham, Alabama

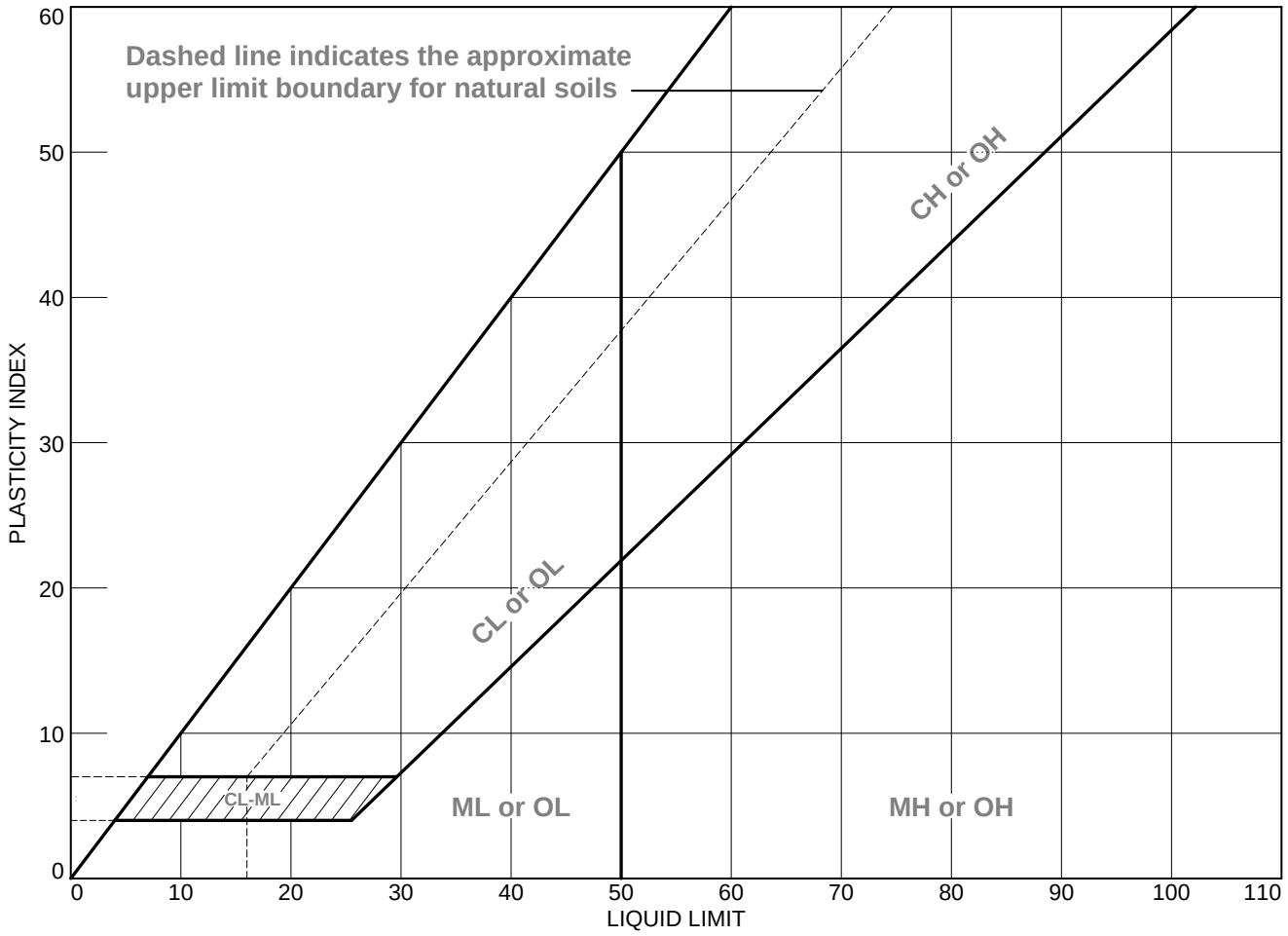
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09909

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-8	8	29.5ft. - 31.0ft	18.4	NP	NV	NP	SM

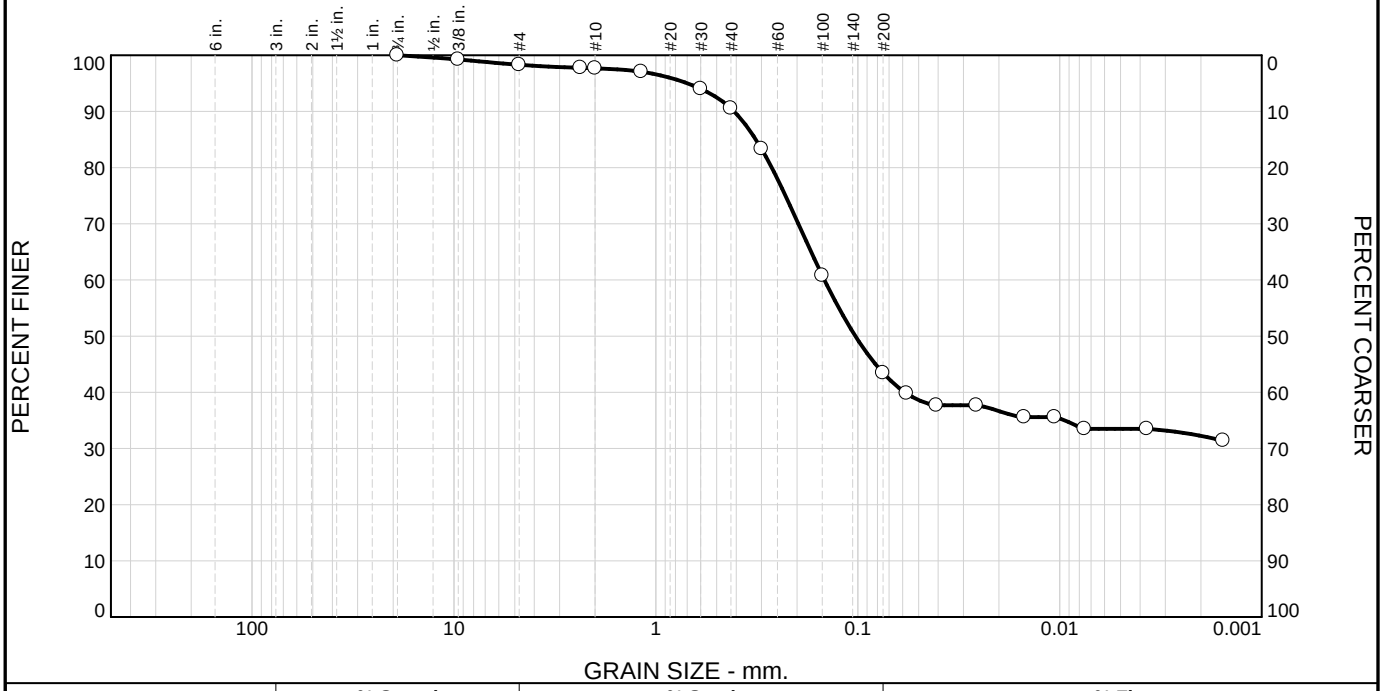
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09907

Tested By: J. Strother (5-6-10) **Checked By:** D. Wilson (5-26-10)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	0.6	7.2	47.1	9.9	33.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75	100.0		
.375	99.2		
#4	98.3		
#8	97.8		
#10	97.7		
#16	97.1		
#30	94.0		
#40	90.5		
#50	83.3		
#100	60.8		
#200	43.4		
0.0573 mm.	39.8		
0.0408 mm.	37.7		
0.0258 mm.	37.7		
0.0150 mm.	35.6		
0.0106 mm.	35.6		
0.0075 mm.	33.5		
0.0037 mm.	33.5		
0.0016 mm.	31.4		

* (no specification provided)

Material Description

Tannish Red SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.4103 D_{85}= 0.3202 D_{60}= 0.1464
D_{50}= 0.1028 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.70

Date Received: 03/30/2010 **Date Tested:** 05/12/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-8 **Depth:** 29.5ft. - 31.0ft **Date Sampled:** NA

Sample Number: 8

Alabama Power Co.

Birmingham, Alabama

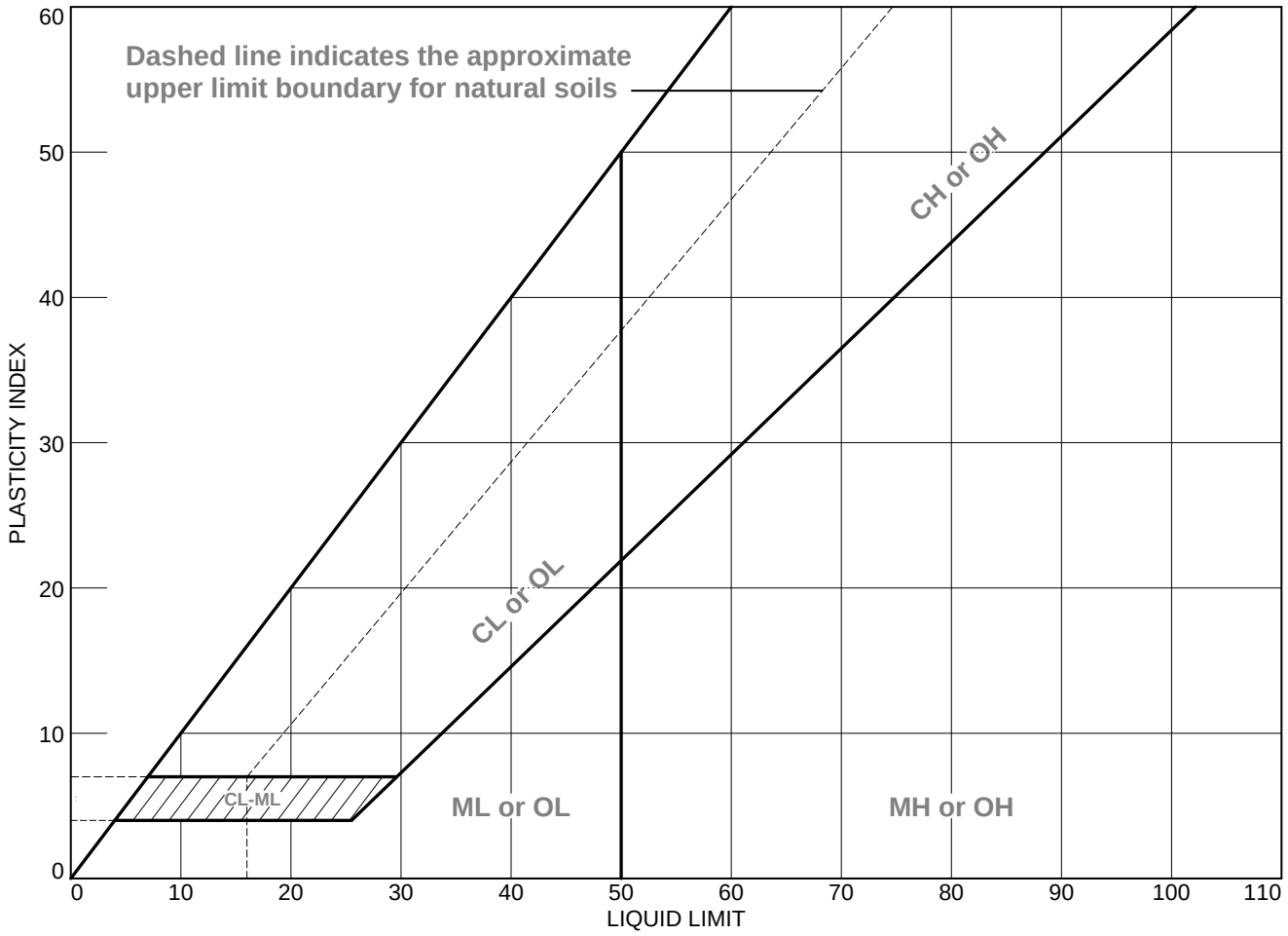
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09907

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-1	2	4.5ft. - 6.0ft.	51.1	NP	NV	NP	ML

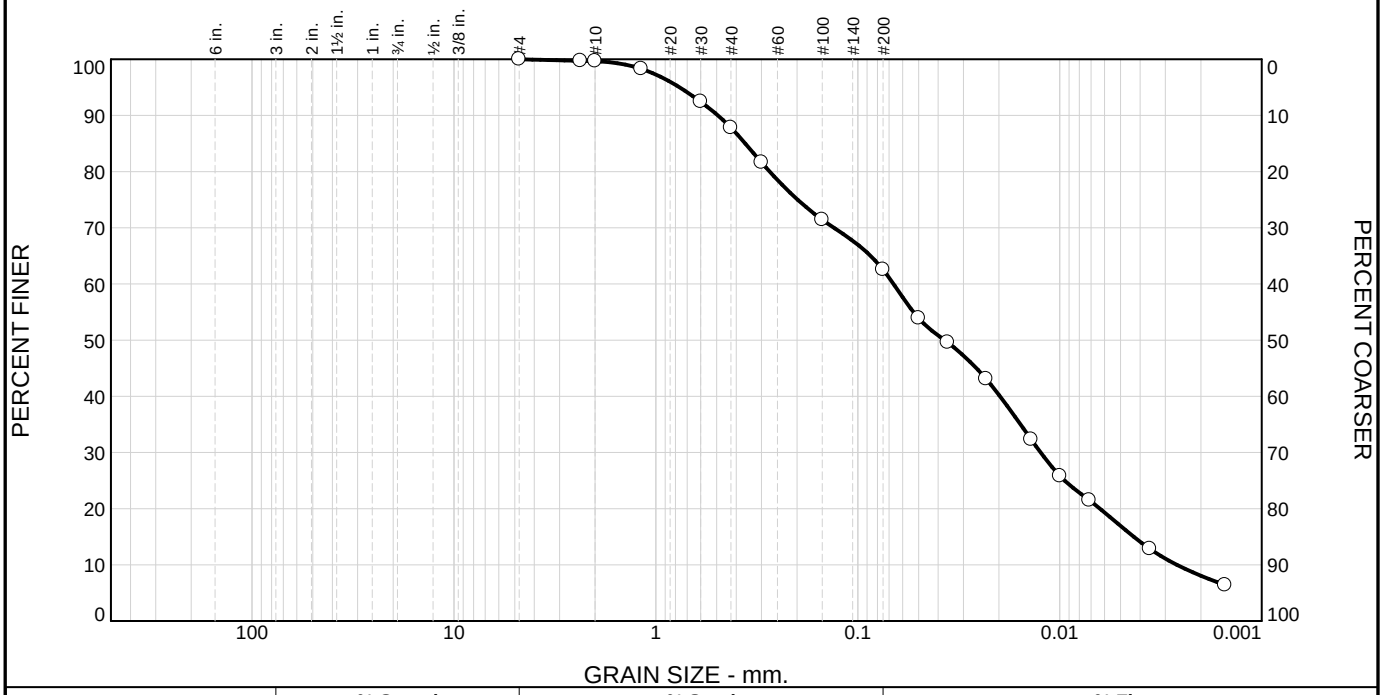
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09908

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	11.9	25.3	45.6	16.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.7		
#10	99.7		
#16	98.3		
#30	92.4		
#40	87.8		
#50	81.6		
#100	71.4		
#200	62.5		
0.0499 mm.	53.9		
0.0358 mm.	49.6		
0.0232 mm.	43.1		
0.0138 mm.	32.3		
0.0100 mm.	25.8		
0.0071 mm.	21.5		
0.0036 mm.	12.9		
0.0015 mm.	6.4		

* (no specification provided)

Material Description

Gray SANDY SILT

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.4934 D_{85}= 0.3611 D_{60}= 0.0666
D_{50}= 0.0372 D_{30}= 0.0124 D_{15}= 0.0043
D_{10}= 0.0026 C_u= 25.33 C_c= 0.88

Remarks

F.M.=0.56

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: NDB-1 **Depth:** 4.5ft. - 6.0ft. **Date Sampled:** NA

Sample Number: 2

Alabama Power Co.

Birmingham, Alabama

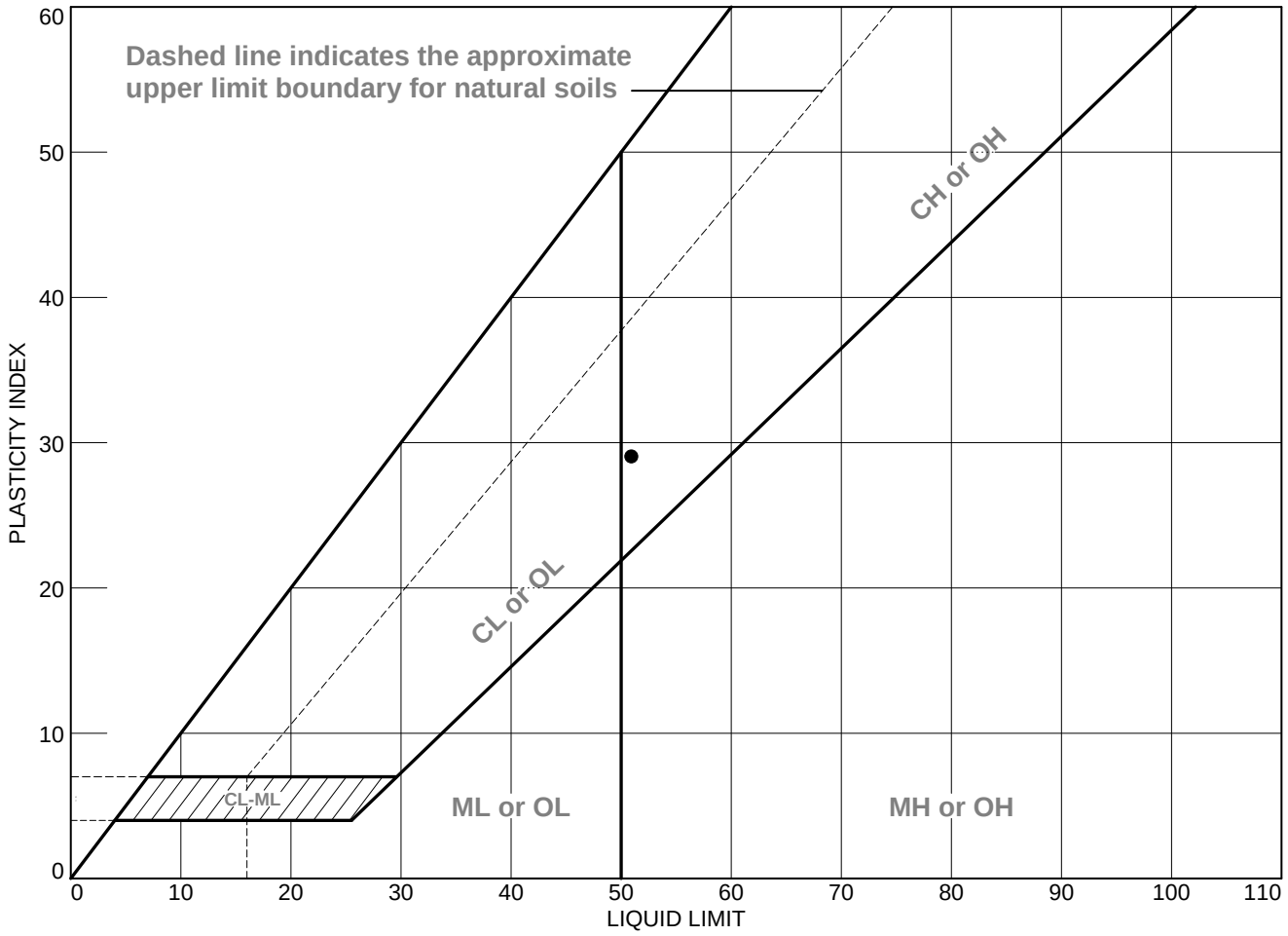
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09908

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-1	8	29.5ft. - 31.0ft.	19.4	22	51	29	CH

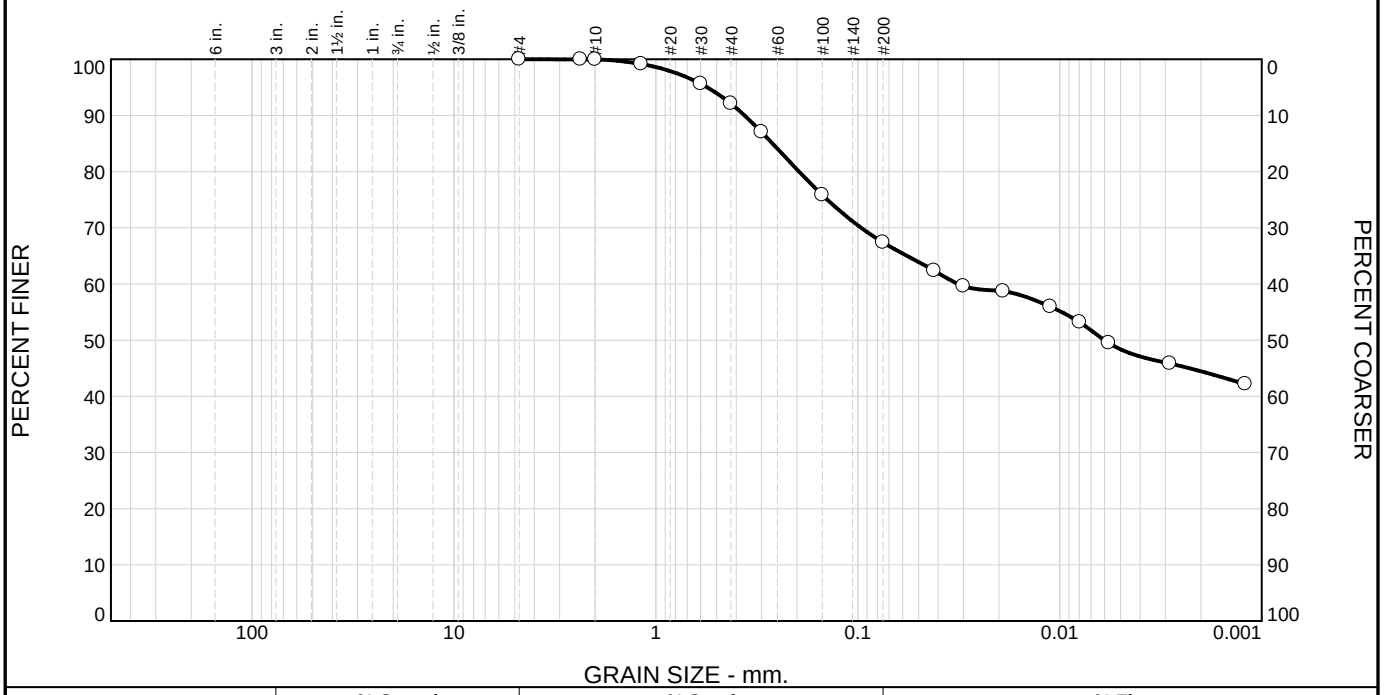
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09910

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	7.9	24.7	19.0	48.4

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	99.2		
#30	95.6		
#40	92.1		
#50	87.0		
#100	75.8		
#200	67.4		
0.0419 mm.	62.4		
0.0300 mm.	59.6		
0.0190 mm.	58.7		
0.0111 mm.	55.9		
0.0080 mm.	53.2		
0.0057 mm.	49.5		
0.0028 mm.	45.8		
0.0012 mm.	42.2		

* (no specification provided)

Material Description

Reddish gray SANDY FAT CLAY

Atterberg Limits (ASTM D 4318)

PL= 22 **LL=** 51 **PI=** 29

Classification

USCS (D 2487)= CH **AASHTO (M 145)=** A-7-6(18)

Coefficients

D_{90}= 0.3642 D_{85}= 0.2646 D_{60}= 0.0319
D_{50}= 0.0060 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.42

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: NDB-1 **Depth:** 29.5ft. - 31.0ft. **Date Sampled:** NA

Sample Number: 8

Alabama Power Co.

Birmingham, Alabama

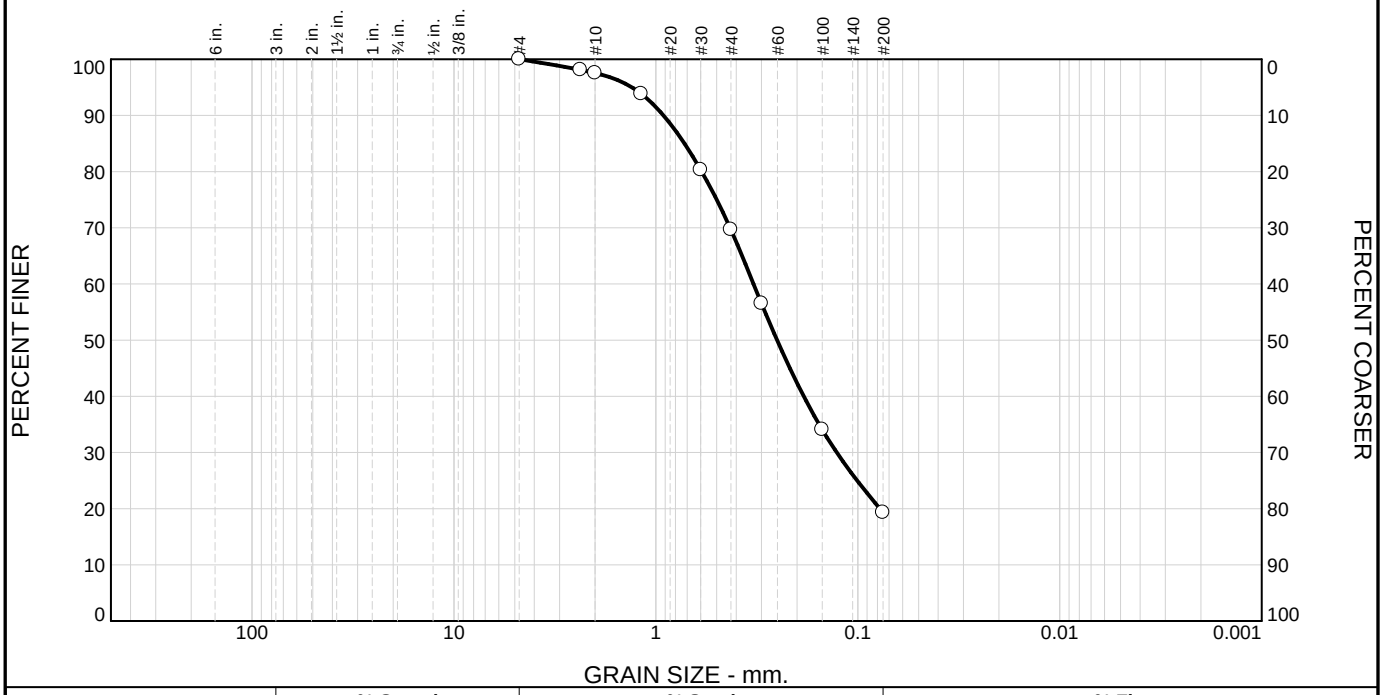
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09910

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.5	27.9	50.3	19.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	98.1		
#10	97.5		
#16	93.8		
#30	80.3		
#40	69.6		
#50	56.5		
#100	34.0		
#200	19.3		

* (no specification provided)

Material Description

Brown SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.9168 D_{85}= 0.7220 D_{60}= 0.3286
D_{50}= 0.2511 D_{30}= 0.1272 D_{15}=
D_{10}= C_u= C_c=

Remarks

%Moist = 12.2
F.M.=1.37

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: NDB-2 **Depth:** 14.5ft. - 16.0ft. **Date Sampled:** NA

Sample Number: 5

Alabama Power Co.

Birmingham, Alabama

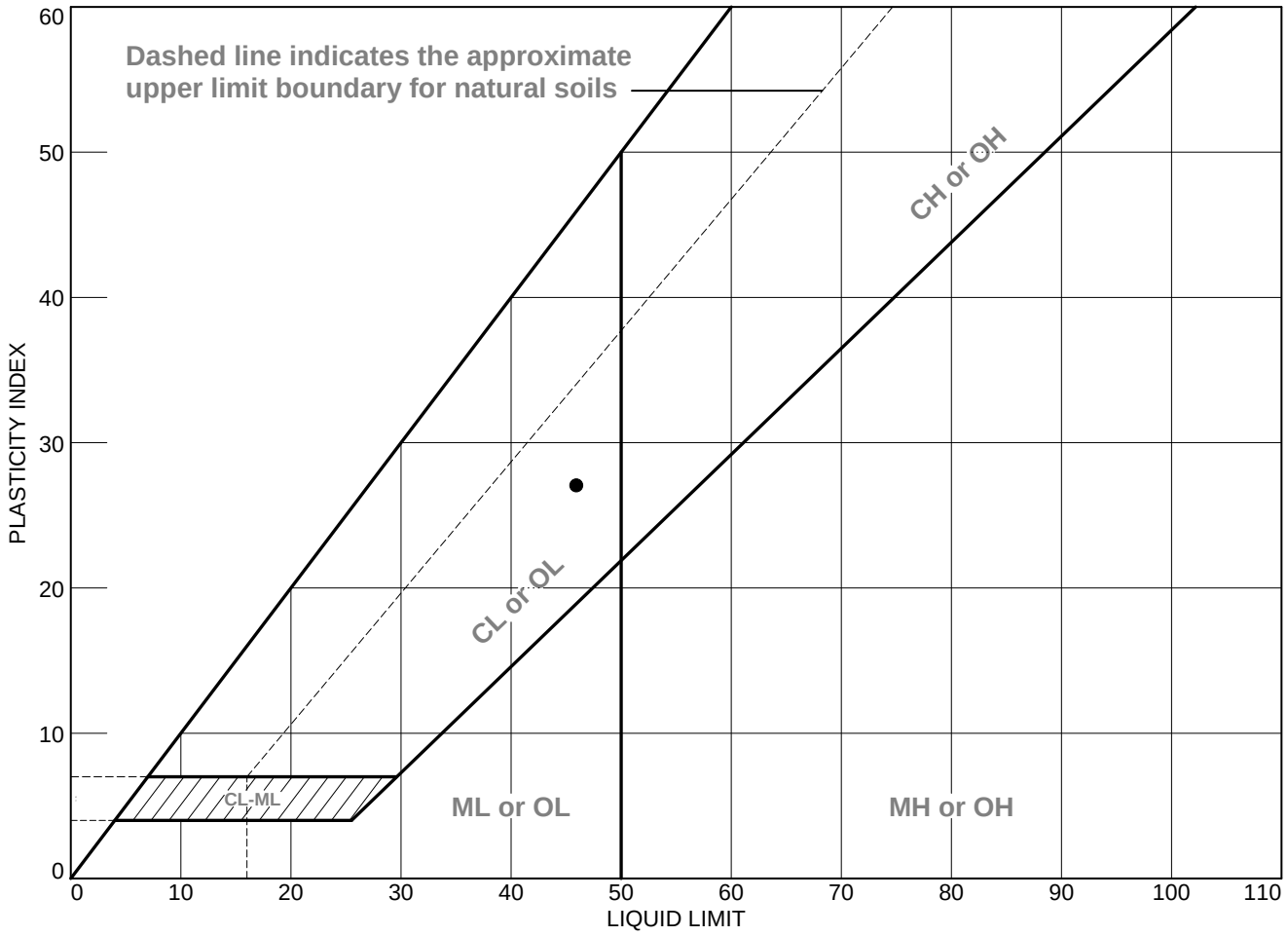
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09912

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-2	7	24.5ft. - 26.0ft.	16.1	19	46	27	SC

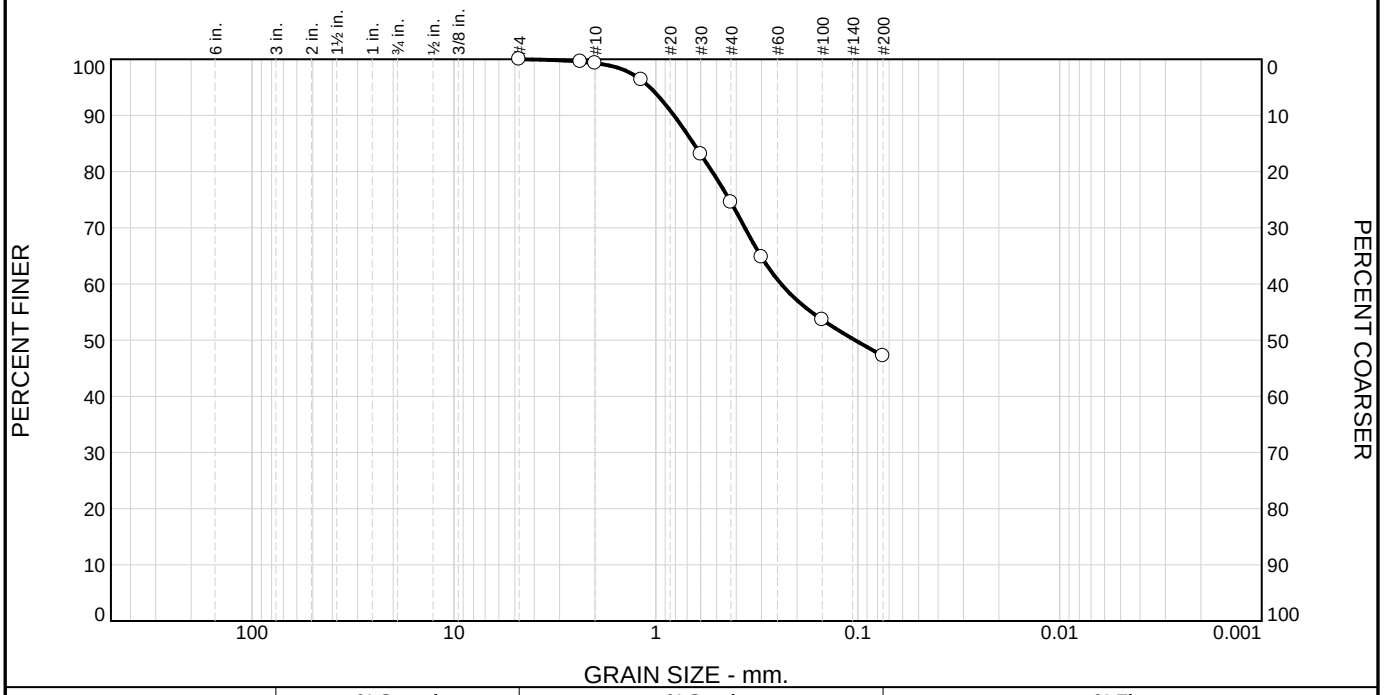
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09913

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.7	24.8	27.3	47.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.6		
#10	99.3		
#16	96.3		
#30	83.1		
#40	74.5		
#50	64.8		
#100	53.6		
#200	47.2		

* (no specification provided)

Material Description

Brownish red CLAYEY SAND

Atterberg Limits (ASTM D 4318)

PL= 19 **LL=** 46 **PI=** 27

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-7-6(8)

Coefficients

D_{90}= 0.8138 D_{85}= 0.6507 D_{60}= 0.2399
D_{50}= 0.1034 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.03

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: 05-26-2010

Source of Sample: NDB-2 **Depth:** 24.5ft. - 26.0ft. **Date Sampled:** NA

Sample Number: 7

Alabama Power Co.

Birmingham, Alabama

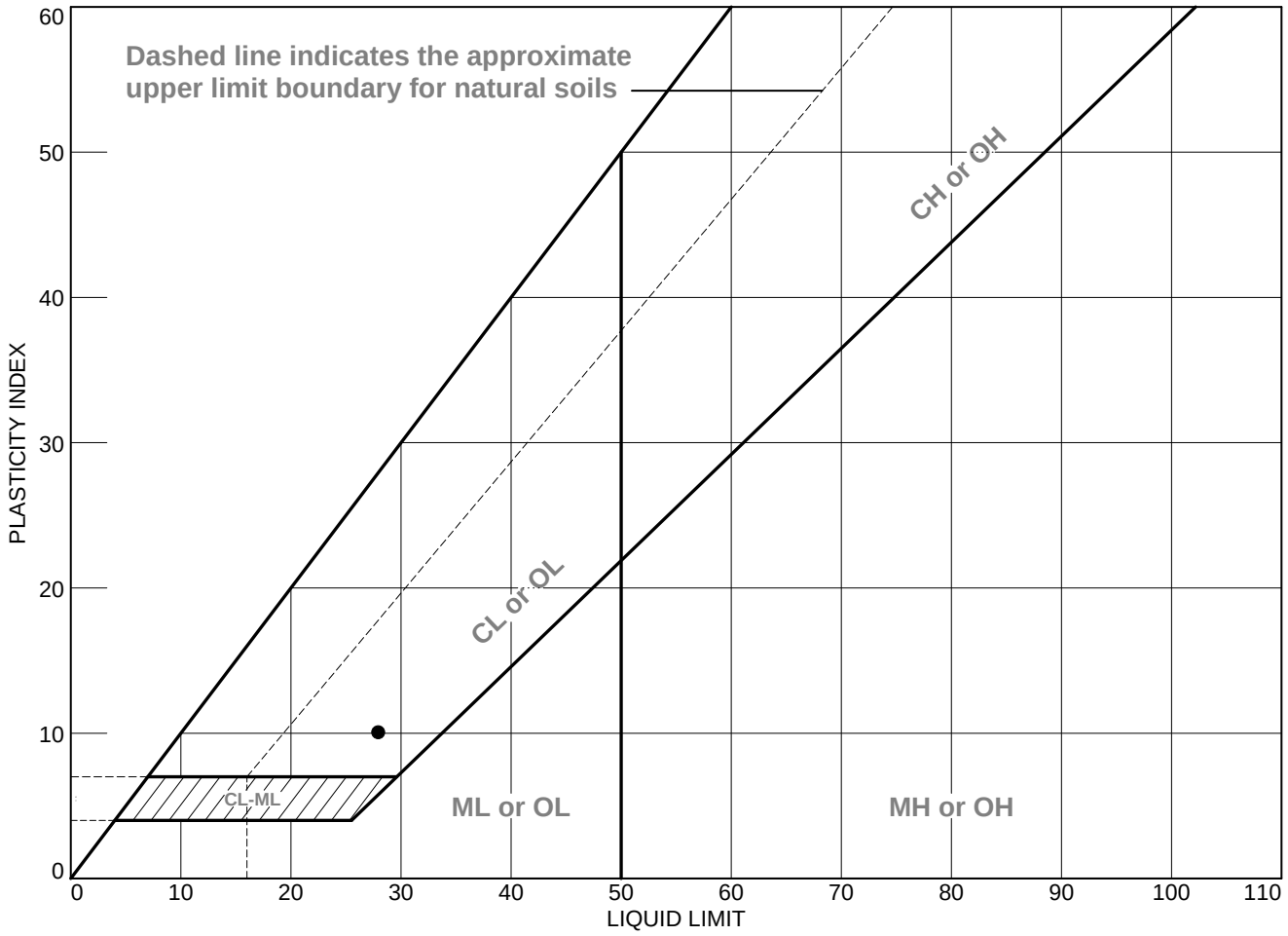
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09913

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-3	3	7.5ft. -9.0ft.	30.8	18	28	10	SC

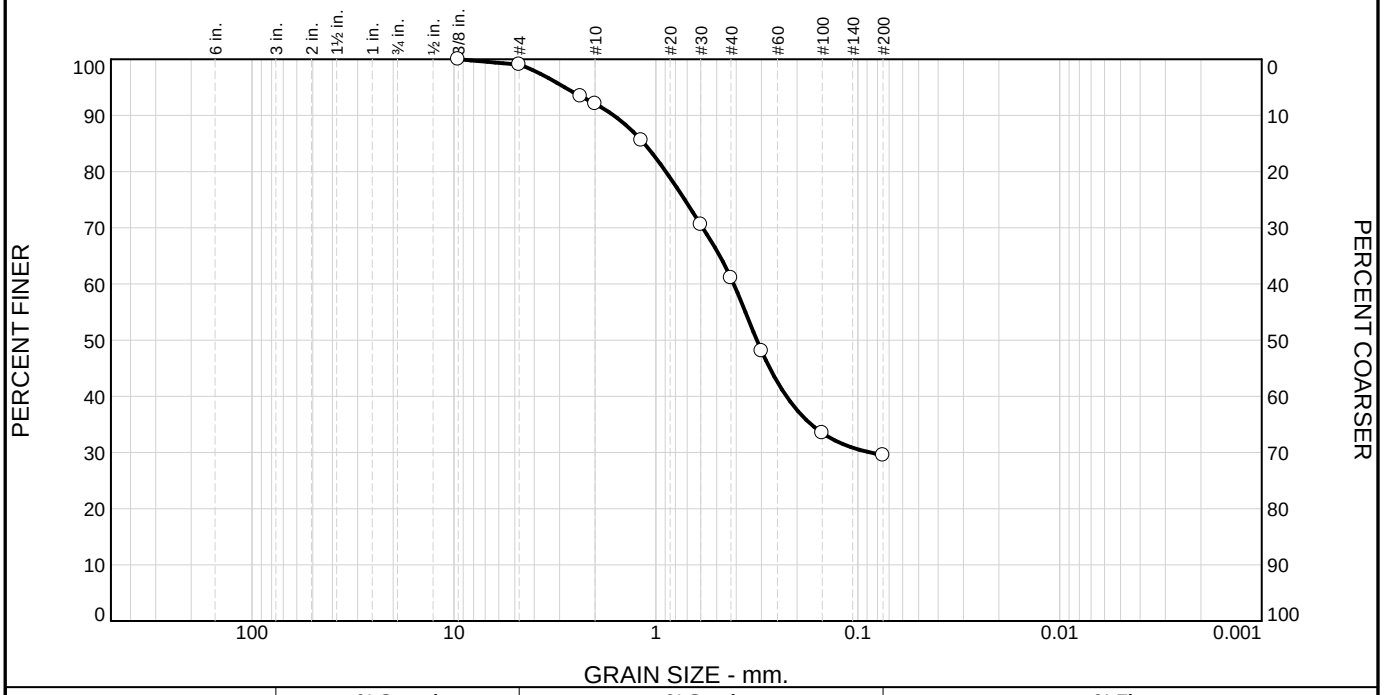
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09911

Tested By: J.Strother (5-14-2010 **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.0	6.9	31.0	31.6	29.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	99.0		
#8	93.4		
#10	92.1		
#16	85.6		
#30	70.6		
#40	61.1		
#50	48.1		
#100	33.5		
#200	29.5		

* (no specification provided)

Material Description

Tan CLAYEY SAND

Atterberg Limits (ASTM D 4318)

PL= 18 **LL=** 28 **PI=** 10

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 1.6164 D_{85}= 1.1425 D_{60}= 0.4119
D_{50}= 0.3164 D_{30}= 0.0867 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.70

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: NDB-3 **Depth:** 7.5ft. -9.0ft. **Date Sampled:** NA

Sample Number: 3

Alabama Power Co.

Birmingham, Alabama

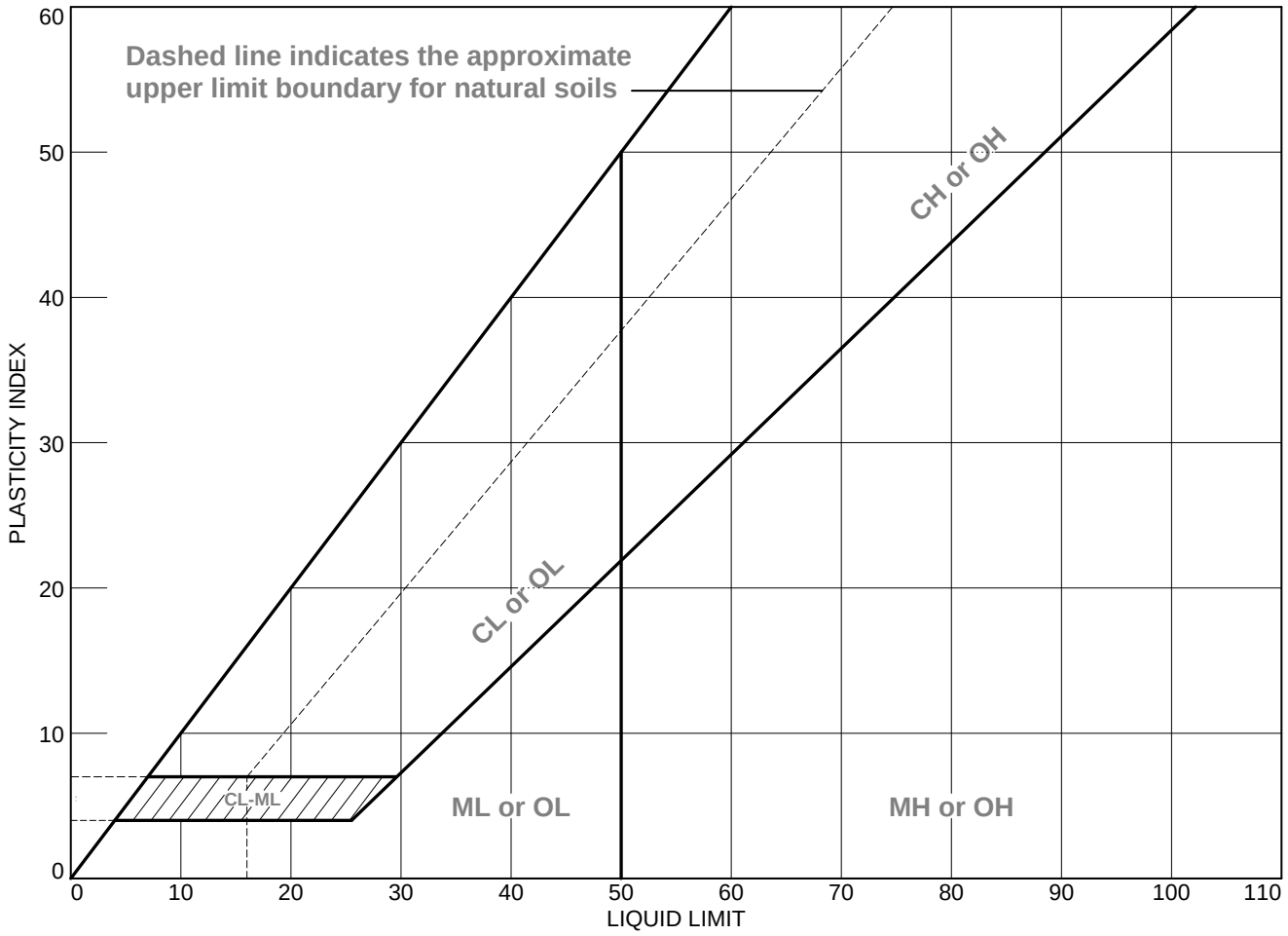
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09911

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-3	6	19.5ft. - 21.0ft.	11.3	NP	NV	NP	SM

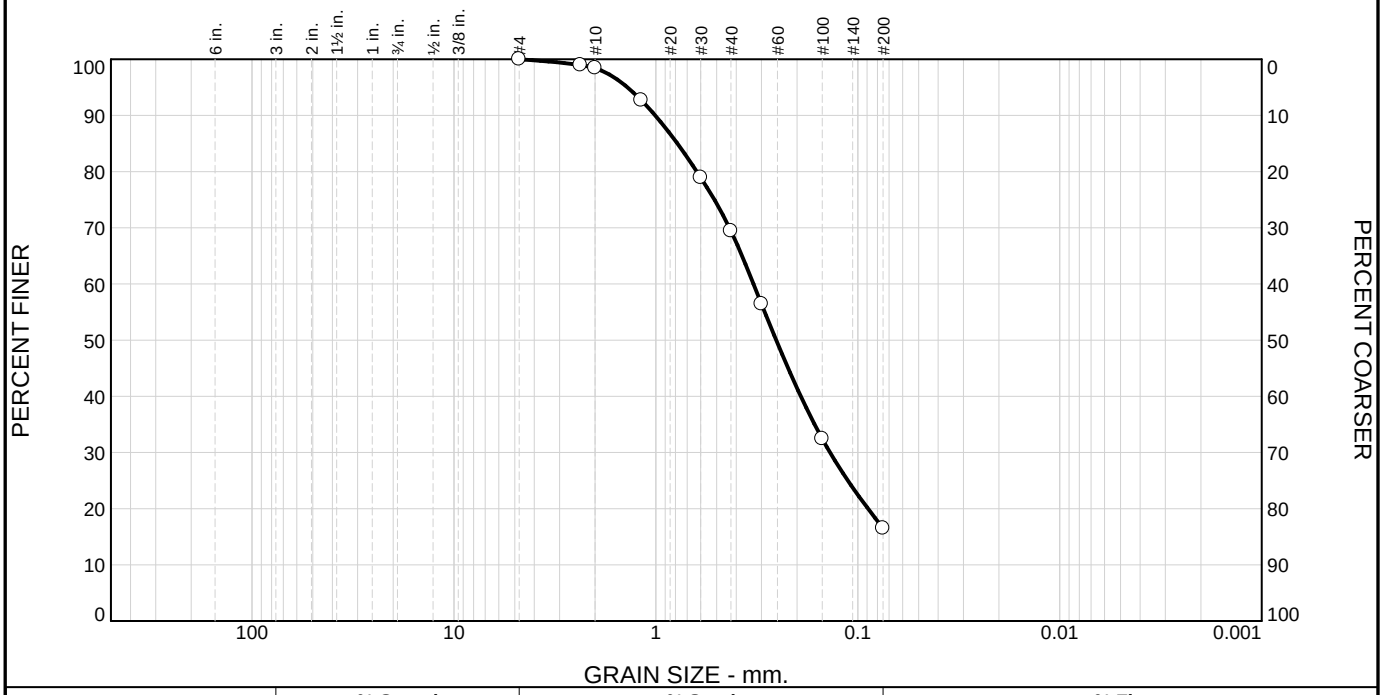
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09914

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.6	29.0	52.9	16.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	98.9		
#10	98.4		
#16	92.7		
#30	78.9		
#40	69.4		
#50	56.4		
#100	32.4		
#200	16.5		

* (no specification provided)

Material Description

Gray SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 1.0078 D_{85}= 0.7829 D_{60}= 0.3288
D_{50}= 0.2537 D_{30}= 0.1373 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.41

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: NDB-3 **Depth:** 19.5ft. - 21.0ft. **Date Sampled:** NA

Sample Number: 6

Alabama Power Co.

Birmingham, Alabama

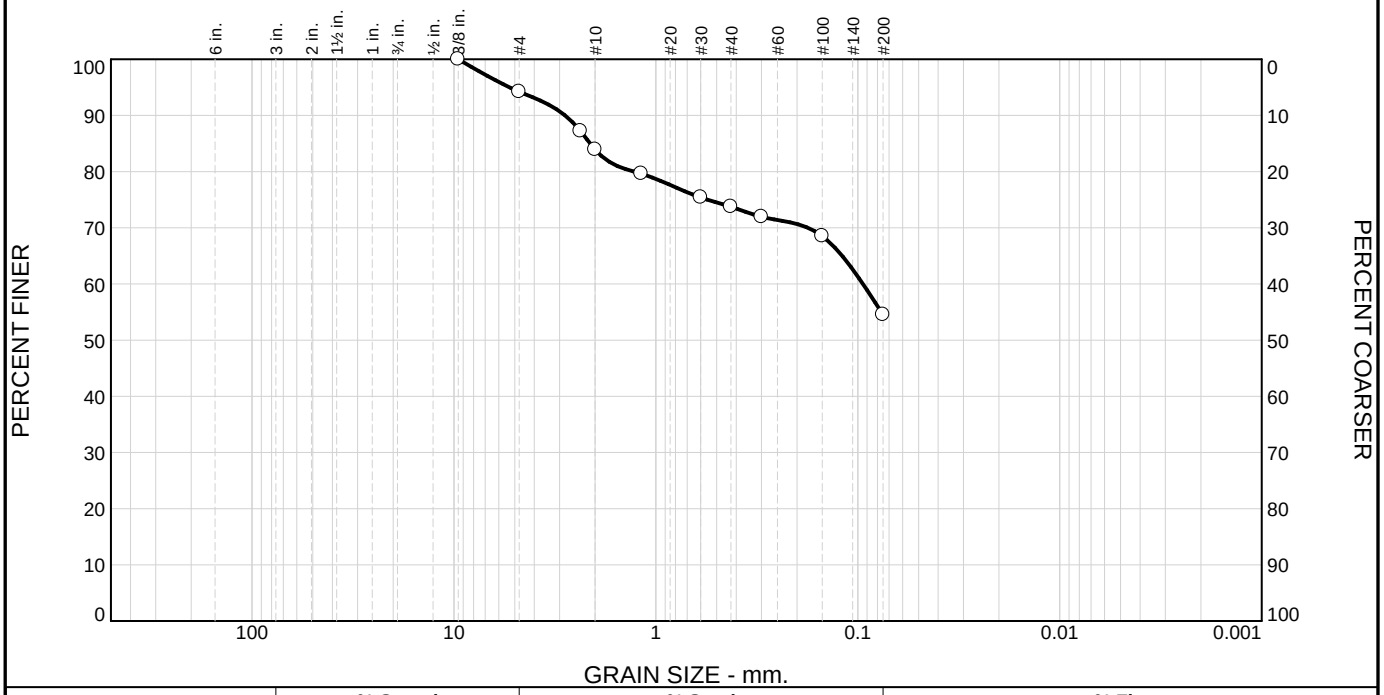
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09914

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.8	10.3	10.2	19.2	54.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	94.2		
#8	87.2		
#10	83.9		
#16	79.6		
#30	75.4		
#40	73.7		
#50	72.0		
#100	68.5		
#200	54.5		

* (no specification provided)

Material Description

Brown SANDY SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 2.8187 D_{85}= 2.1160 D_{60}= 0.0943
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

%Moist = 13.9
F.M.=1.23

Date Received: 03/30/2010 **Date Tested:** 05/12/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: NDB-3 **Depth:** 29.5ft. - 31.0ft. **Date Sampled:** NA

Sample Number: 8

Alabama Power Co.

Birmingham, Alabama

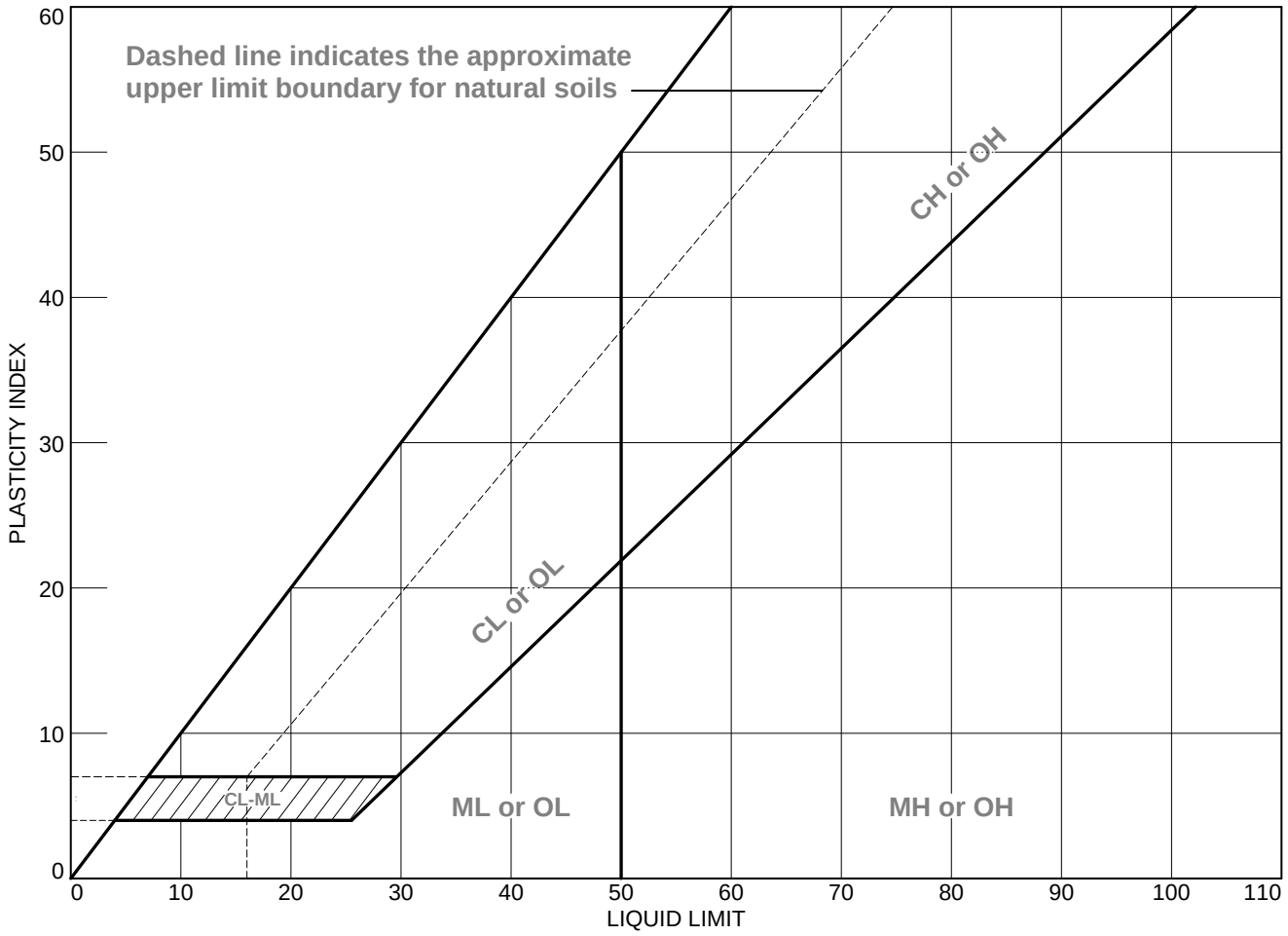
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09905

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-4	4	9.5ft. - 11.0ft	69.7	NP	NV	NP	ML

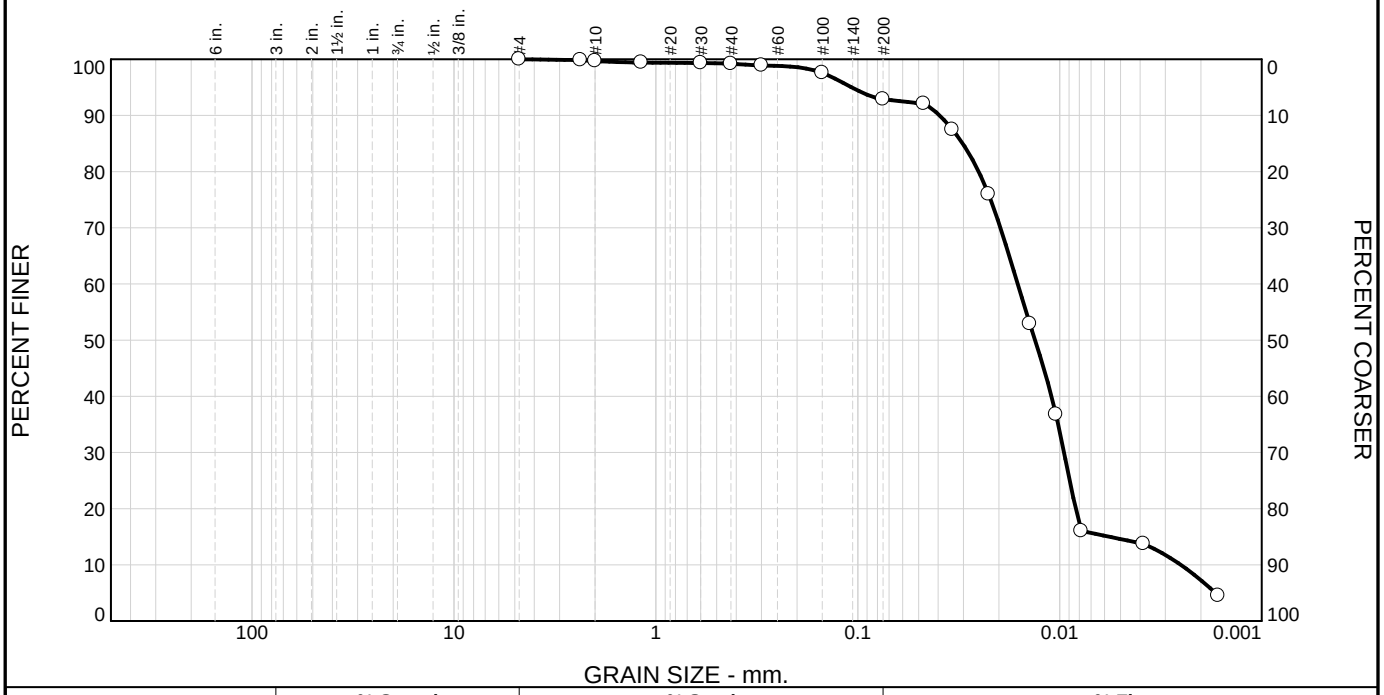
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09915

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	0.5	6.3	78.3	14.6

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.9		
#10	99.7		
#16	99.4		
#30	99.3		
#40	99.2		
#50	98.9		
#100	97.6		
#200	92.9		
0.0472 mm.	92.1		
0.0340 mm.	87.5		
0.0225 mm.	76.0		
0.0141 mm.	52.9		
0.0104 mm.	36.8		
0.0078 mm.	16.0		
0.0039 mm.	13.7		
0.0016 mm.	4.5		

* (no specification provided)

Material Description

Black SILT

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0393 D_{85}= 0.0303 D_{60}= 0.0162
D_{50}= 0.0133 D_{30}= 0.0095 D_{15}= 0.0057
D_{10}= 0.0025 C_u= 6.43 C_c= 2.24

Remarks

F.M.=0.05

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: NDB-4 **Depth:** 9.5ft. - 11.0ft **Date Sampled:** NA

Sample Number: 4

Alabama Power Co.

Birmingham, Alabama

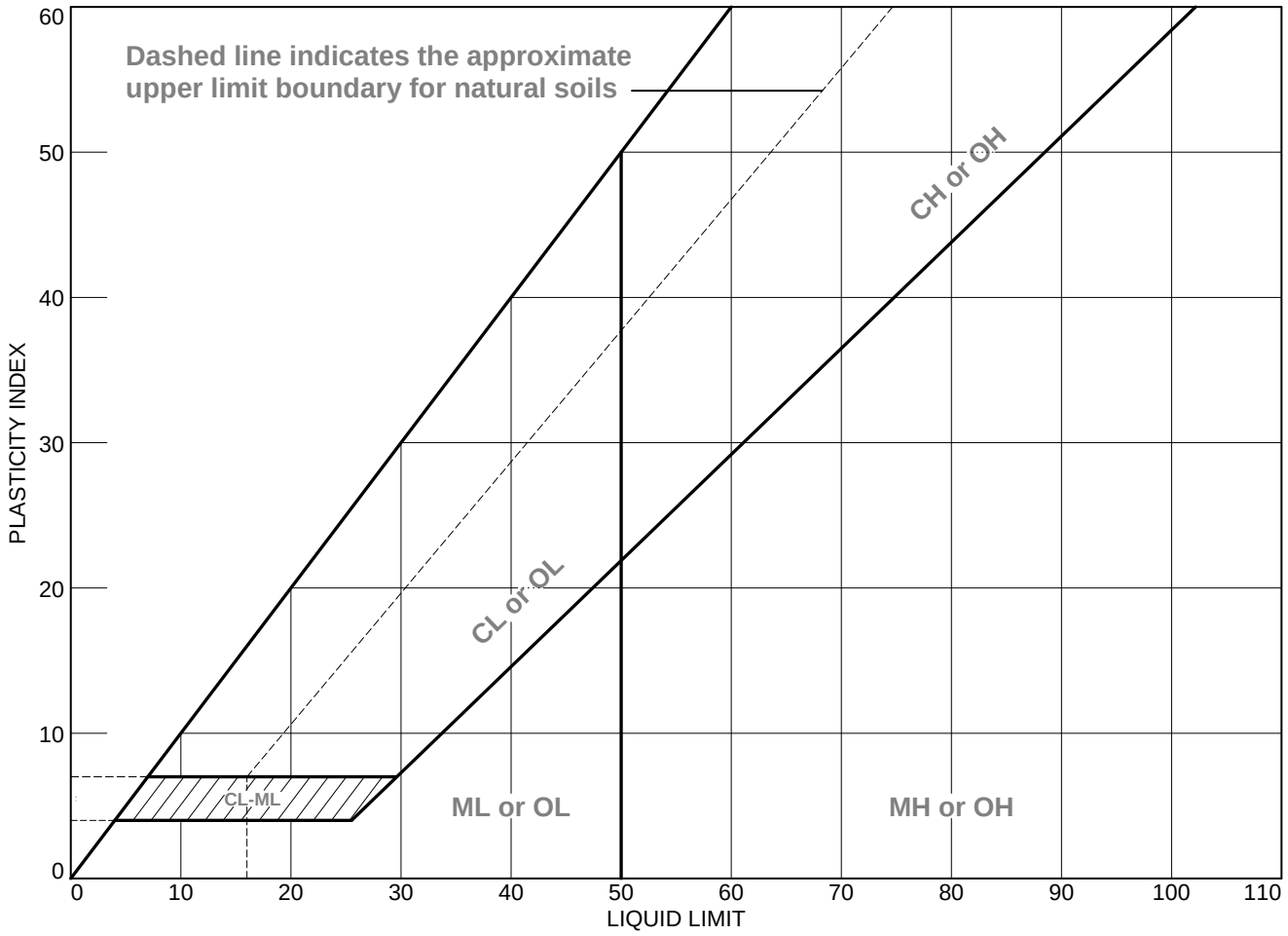
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09915

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-4	5	14.5ft. - 16.0ft.	61.1	NP	NV	NP	ML

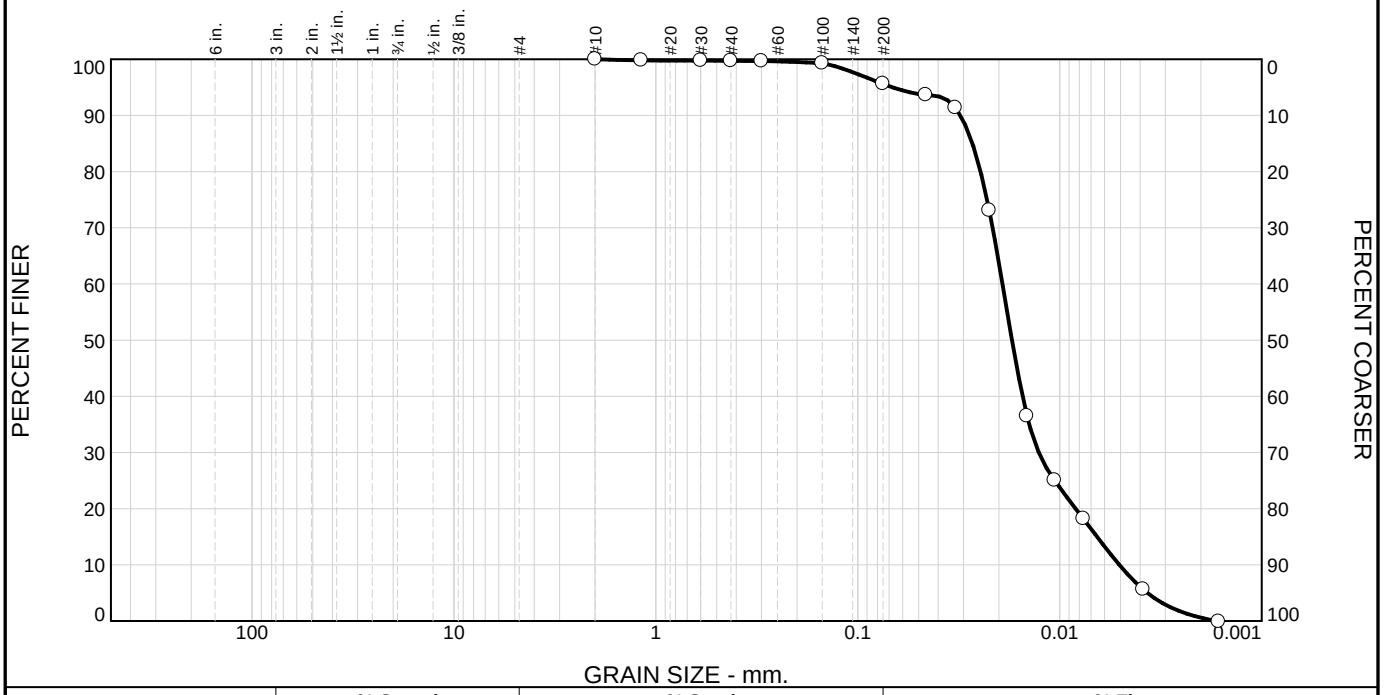
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09916

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	4.1	85.8	9.8

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.8		
#30	99.8		
#40	99.7		
#50	99.7		
#100	99.3		
#200	95.6		
0.0460 mm.	93.6		
0.0328 mm.	91.4		
0.0223 mm.	73.1		
0.0145 mm.	36.5		
0.0106 mm.	25.1		
0.0076 mm.	18.2		
0.0039 mm.	5.6		
0.0016 mm.			

* (no specification provided)

Material Description

Black SILT

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0310 D_{85}= 0.0271 D_{60}= 0.0192
D_{50}= 0.0172 D_{30}= 0.0127 D_{15}= 0.0065
D_{10}= 0.0051 C_u= 3.79 C_c= 1.66

Remarks

F.M.=0.01

Date Received: 03-31-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Donna WilsonSuperviso

Source of Sample: NDB-4 **Depth:** 14.5ft. - 16.0ft. **Date Sampled:** NA

Sample Number: 5

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09916

217 E. Brent Ln.
PENSACOLA, FLA.
Phone: 477-5100

PENSACOLA TESTING LABORATORIES, INC.

REPORT OF SUMMARY OF LAB TEST DATA

For GULF POWER COMPANY
P.O. BOX 1151
PENSACOLA, FLORIDA 32520

Report No. 55827 se
Date March 2, 1981
Purchase Order No.

Sample identification
BOTTOM ASH, FLY ASH & SAND FROM SMITH PLANT

Sample SUBMITTED BY CLIENT, TESTED By J. SIMS & R. STRICKLIN Date 2-23-81

SAMPLE ID	MAX. DRY DENSITY PCF (ASTM D-698)	OPTIMUM MOISTURE %	ANGLE OF INTERNAL FRICTION	COHESION	REMOLDED DRY DENSITY
50% FLY ASH 50% SAND	100.8	19.6	34°	0	90.7
50% BOTTOM ASH 50% SAND	104.8	14.2	38°	0	94.4
50% BOTTOM ASH 50% FLY ASH	87.0	18.0	35°	0	78.3

NOTE: SAMPLES REMOLDED TO 90% OF MAX. DRY DENSITY (ASTM D-698) AND TESTED IN THE DIRECT SHEAR APPARATUS CONSOLIDATED DRAINED.

Reports to:

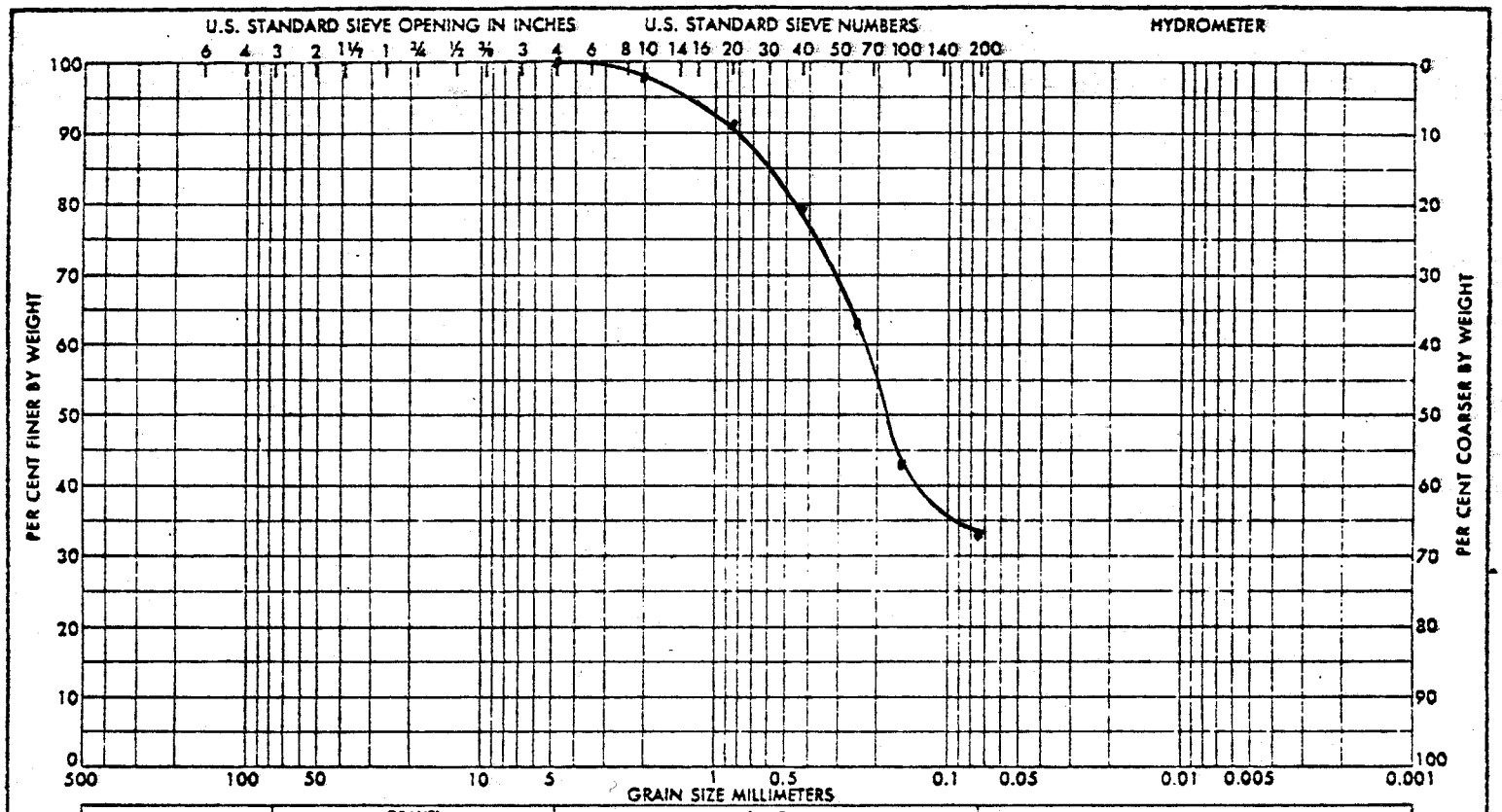
3- GULF POWER
ATTENTION: MR. RALPH CZEPLUCH

PENSACOLA TESTING LABORATORIES

By John D Sims

PENSACOLA TESTING LABORATORIES, INC.

REPORT NO. 55827



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
		SMITH PLANT				
		50% FLY ASH				
		50% SAND				

GRADATION CURVES

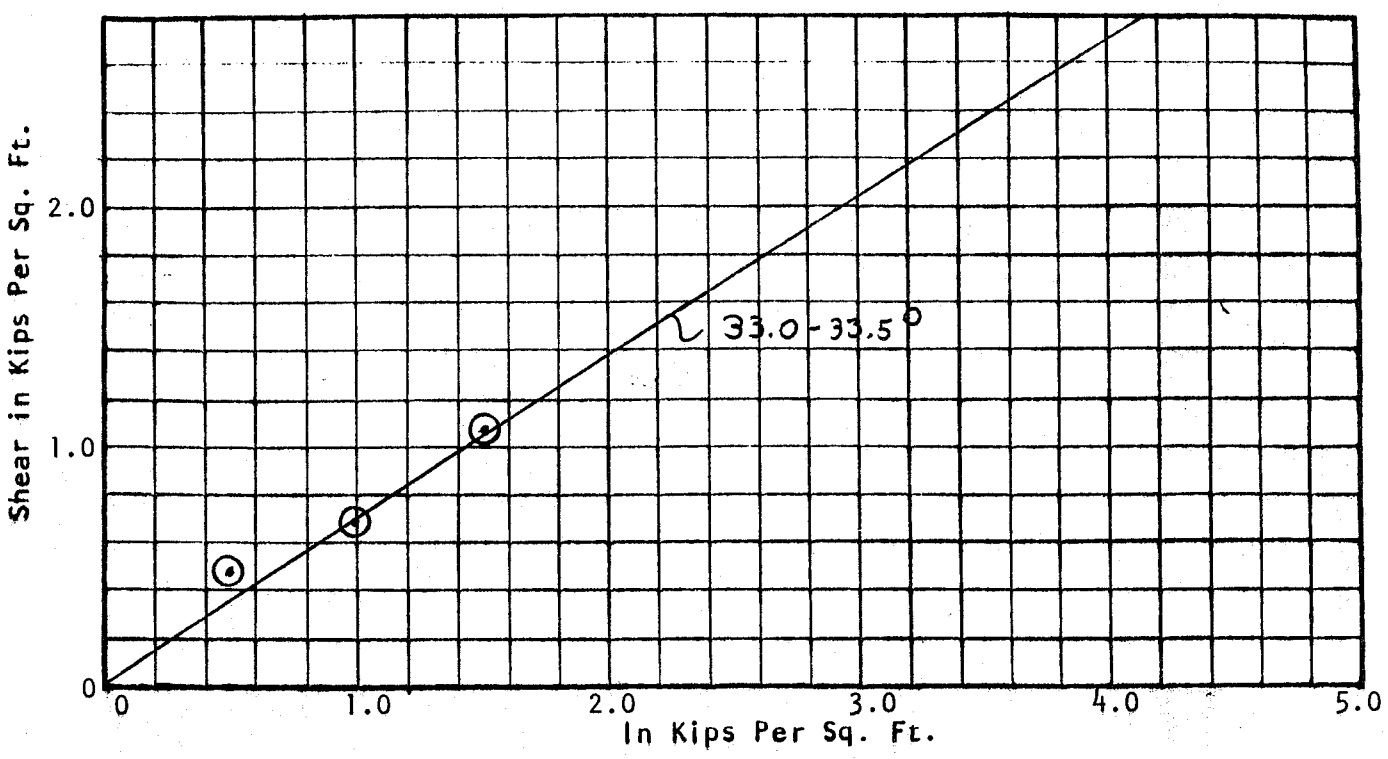
PROJECT: GULF POWER COMPANY
SMITH PLANT

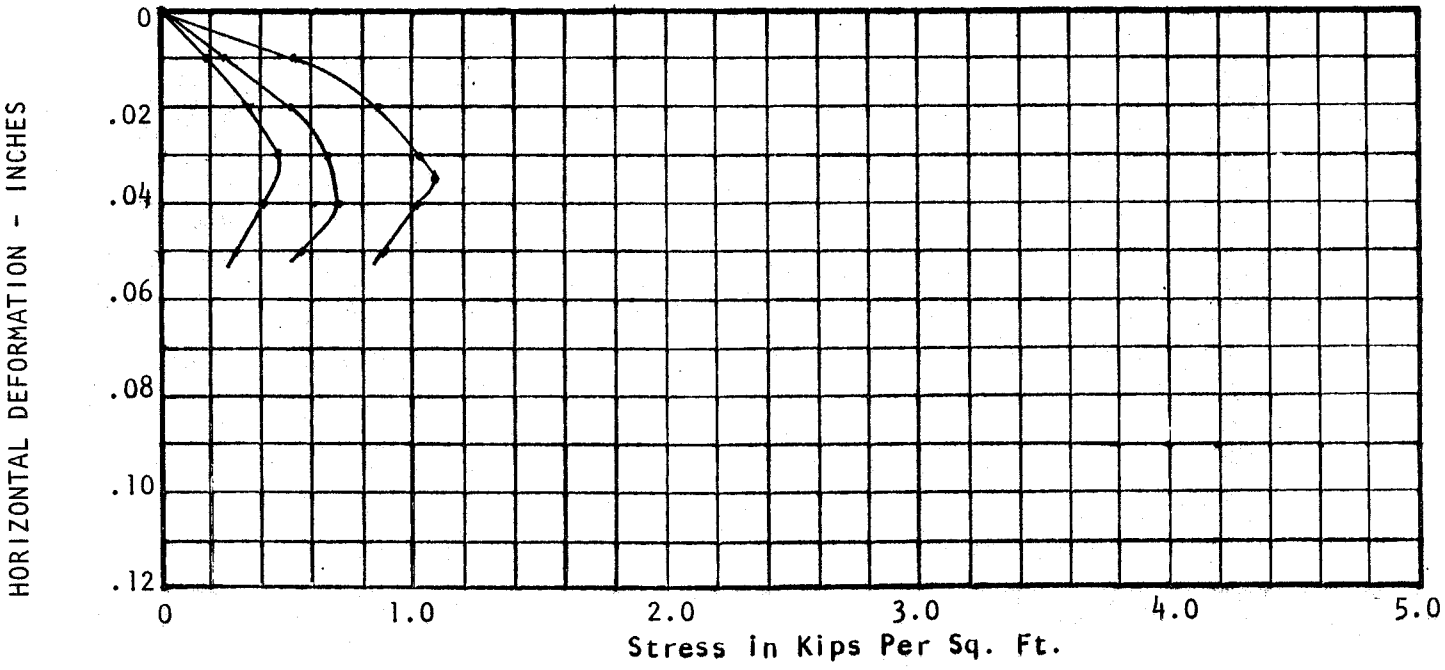
AREA:

BORING NO.:

DATE: 3/2/81

SIEVE SIZES:	#4	#10	#20	#40	#60	#100	#200
% PASSING:	100	97.9	90.6	79.8	62.8	43.2	33.0





STRESS-STRAIN CURVES

"Cohesion", C 0

Angle of Shear Resistance, Ø 34°

Dry Unit Weight, γ 90.7 = 90% ASTM D-698

Water Content, W 19.6

Void Ratio, e

DIRECT SHEAR TEST
GULF POWER CO. - SMITH PLANT - 50% FLY ASH, 50% SAND
(BY LOOSE VOLUME)

PENSACOLA TESTING LABORATORIES, INC

CHEMICAL ANALYSES – INSPECTIONS – TESTS

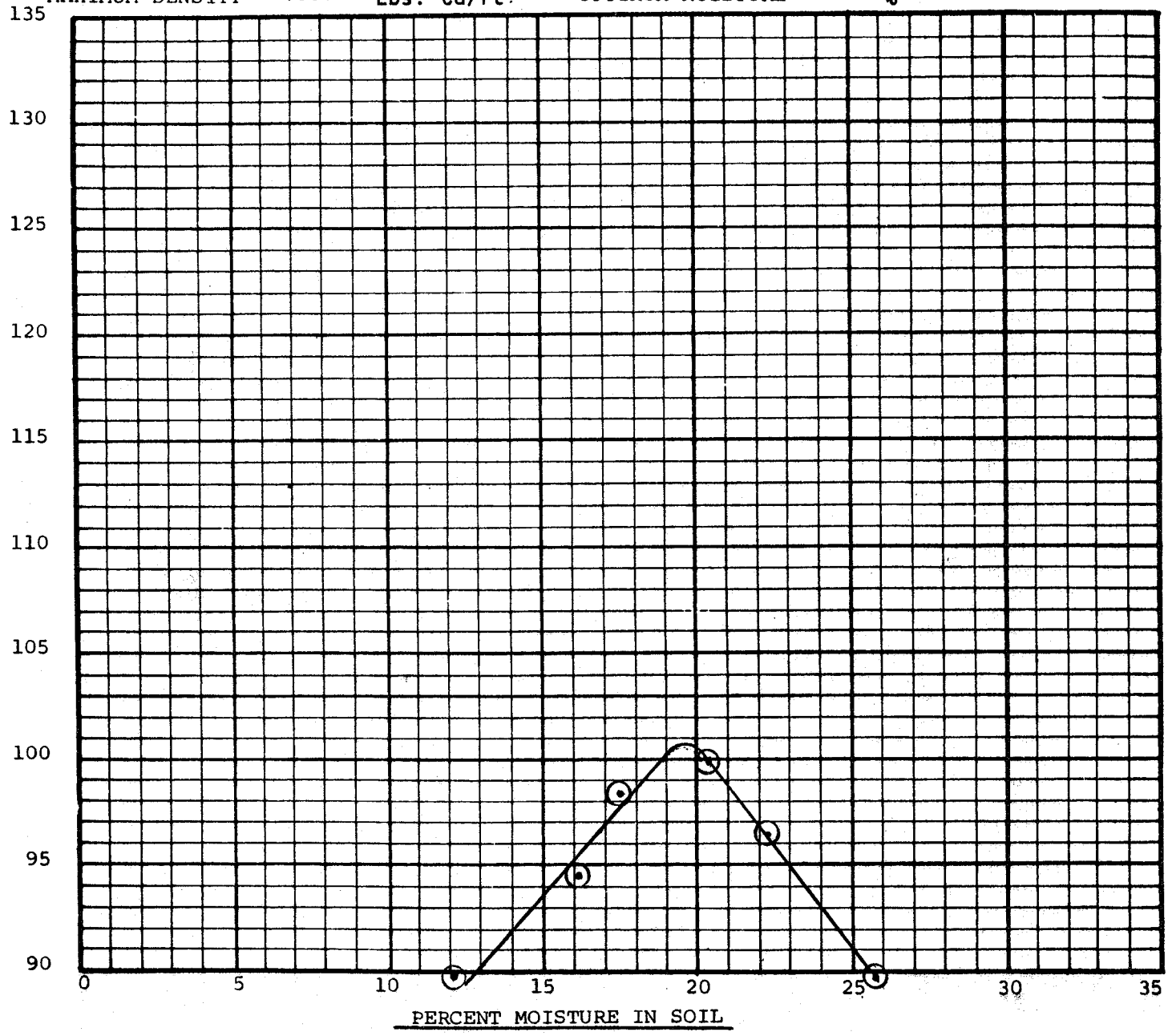
OFFICE AND LABORATORIES
217 East Brent Lane
Pensacola, Florida 32503
Phone: 477-5100

PROCTOR

PROJECT SMITH PLANT
FOR GULF POWER COMPANY, P.O. BOX 1151, PENSACOLA, FL
SAMPLE IDENTIFICATION 50% FLY ASH, 50% SAND (BY LOOSE VOLUME)
APPLICABLE SPECIFICATION ASTM D-698
SAMPLED AND TESTED BY CLIENT & J. SIMS

REPORT NO. 55827 bh
DATE 3/2/81
ORDER NO.
DATE 2/23/81

MAXIMUM DENSITY 100.8 Lbs. Cu/Ft. OPTIMUM MOISTURE 19.6 %



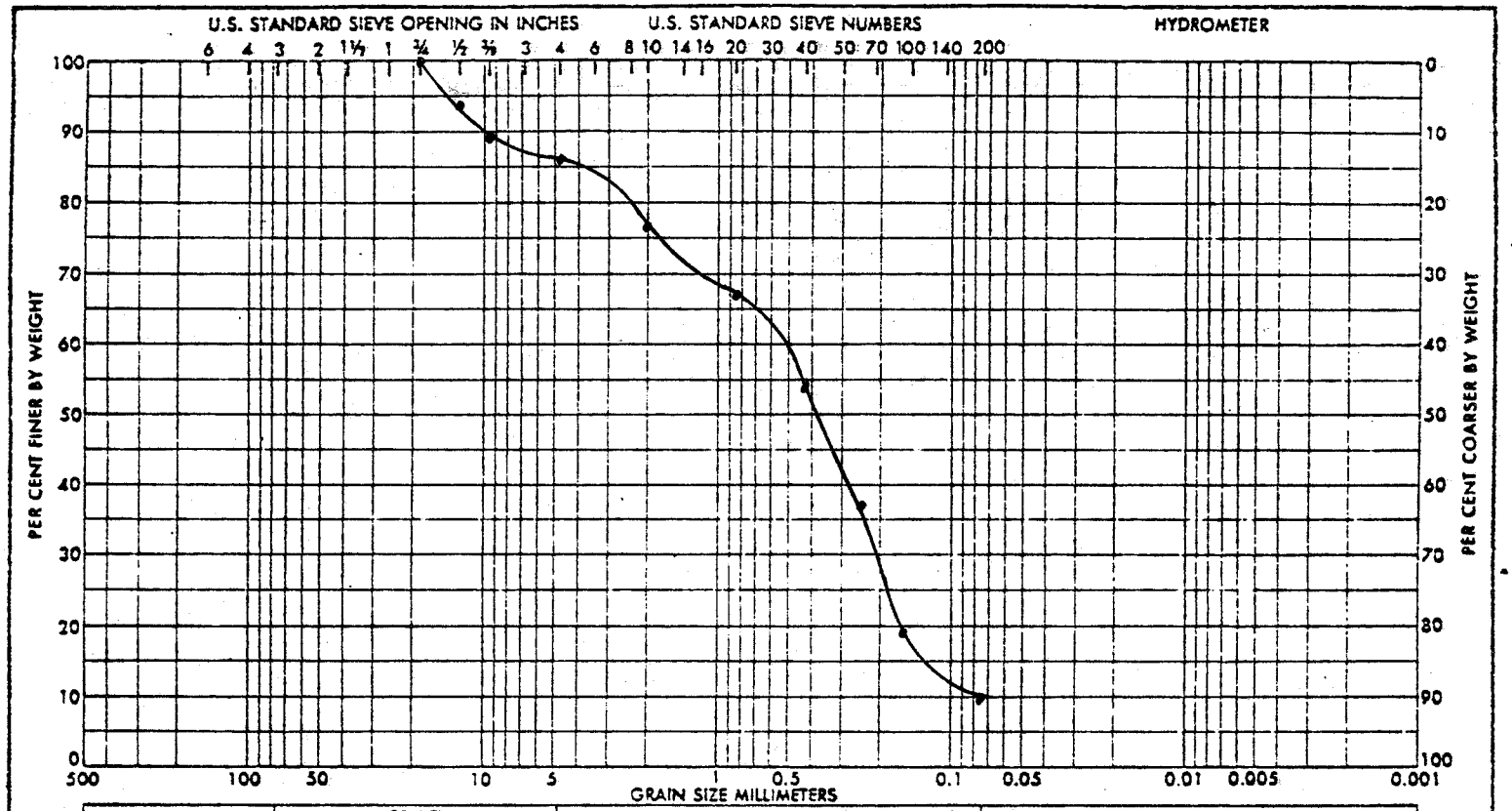
Reports to: 3-Gulf Power Co.

PENSACOLA TESTING LABORATORIES, INC.

BY John D Sims

PENSACOLA TESTING LABORATORIES, INC.

REPORT NO: 55827



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
		SMITH PLANT				
		50% BOTTOM ASH				
		50% SAND				

GRADATION CURVES

PROJECT GULF POWER COMPANY
SMITH PLANT, PANAMA CITY

AREA

BORING NO.

DATE March 2, 1981

SIEVE SIZES: 3/4", ½" 3/8" #4, #10, #20, #40, #60, #100, #200

% PASSING: 100 94.3 89.8 85.5 76.9 66.9 54.2 37.0 19.7 10.0

PENSACOLA TESTING LABORATORIES, INC

CHEMICAL ANALYSES – INSPECTIONS – TESTS

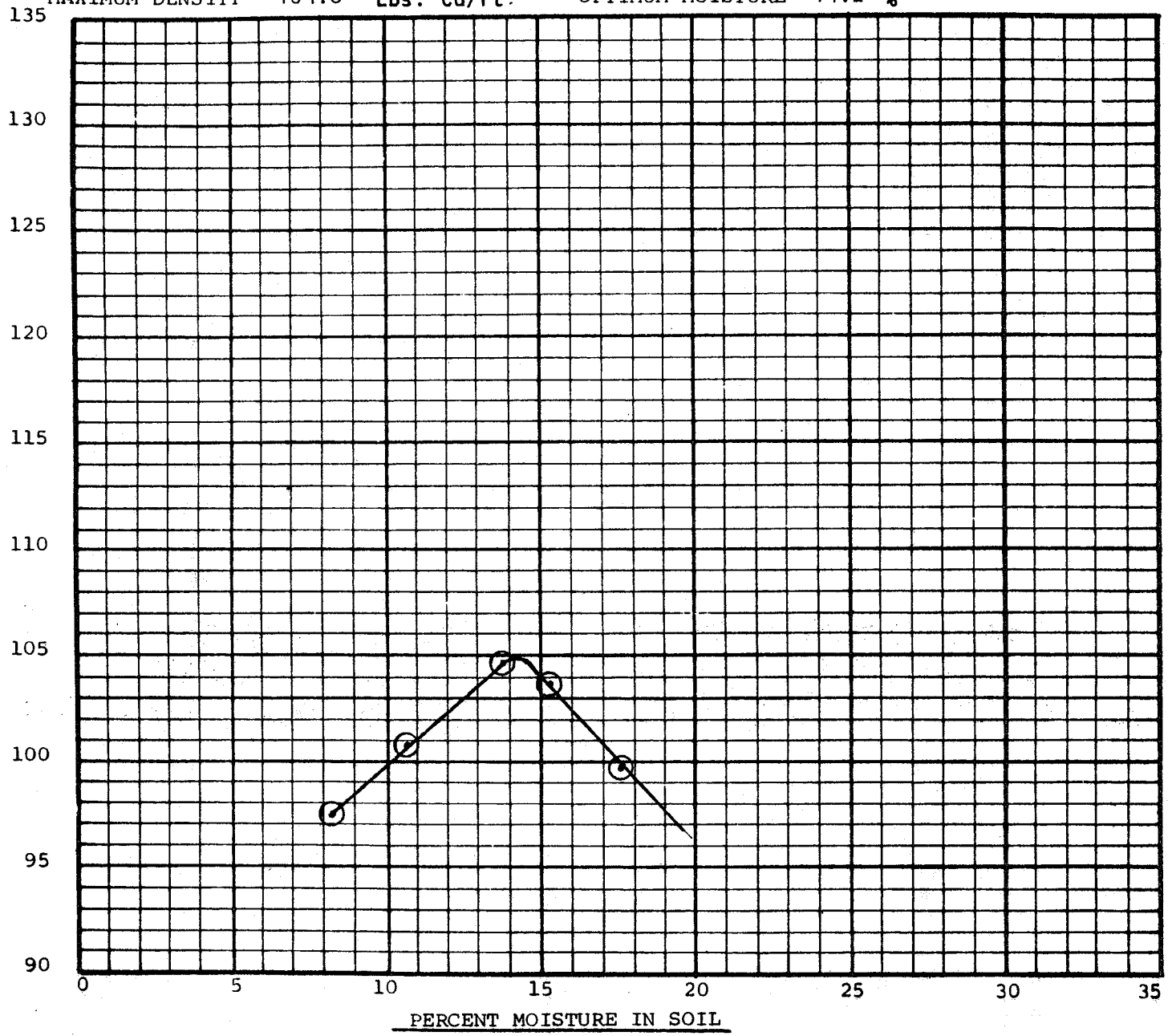
PROCTOR

OFFICE AND LABORATORIES
217 East Brent Lane
Pensacola, Florida 32503
Phone: 477-5100

PROJECT SMITH PLANT
FOR GULF POWER COMPANY, P.O. BOX 1151, PENSACOLA FLA.
SAMPLE IDENTIFICATION 50% BOTTOM ASH, 50% SAND (BY LOOSE VOC.)
APPLICABLE SPECIFICATION ASTM D-698
SAMPLED AND TESTED BY J. SIMS

REPORT NO. 55827 se
DATE March 2, 1981
ORDER NO.
DATE 2-23-81

MAXIMUM DENSITY 104.8 Lbs. Cu/Ft. OPTIMUM MOISTURE 14.2 %



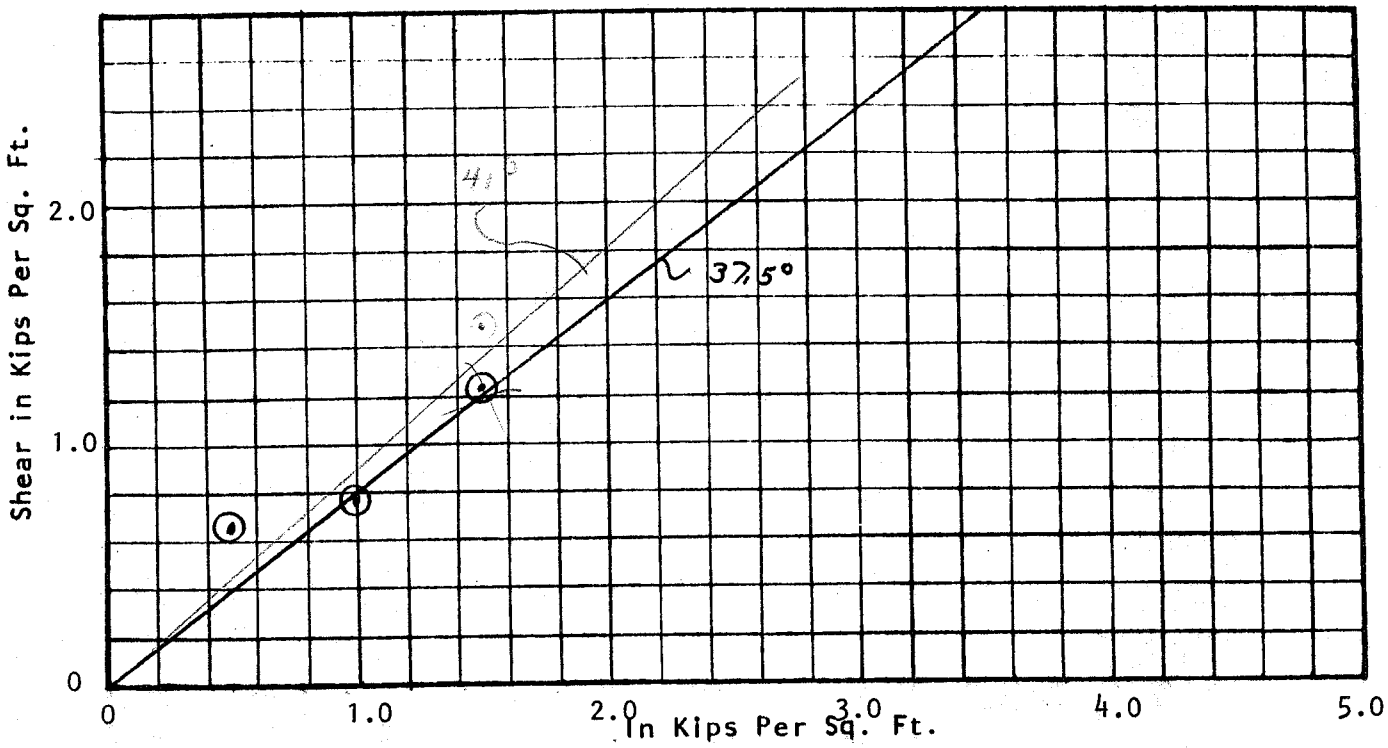
Reports to:

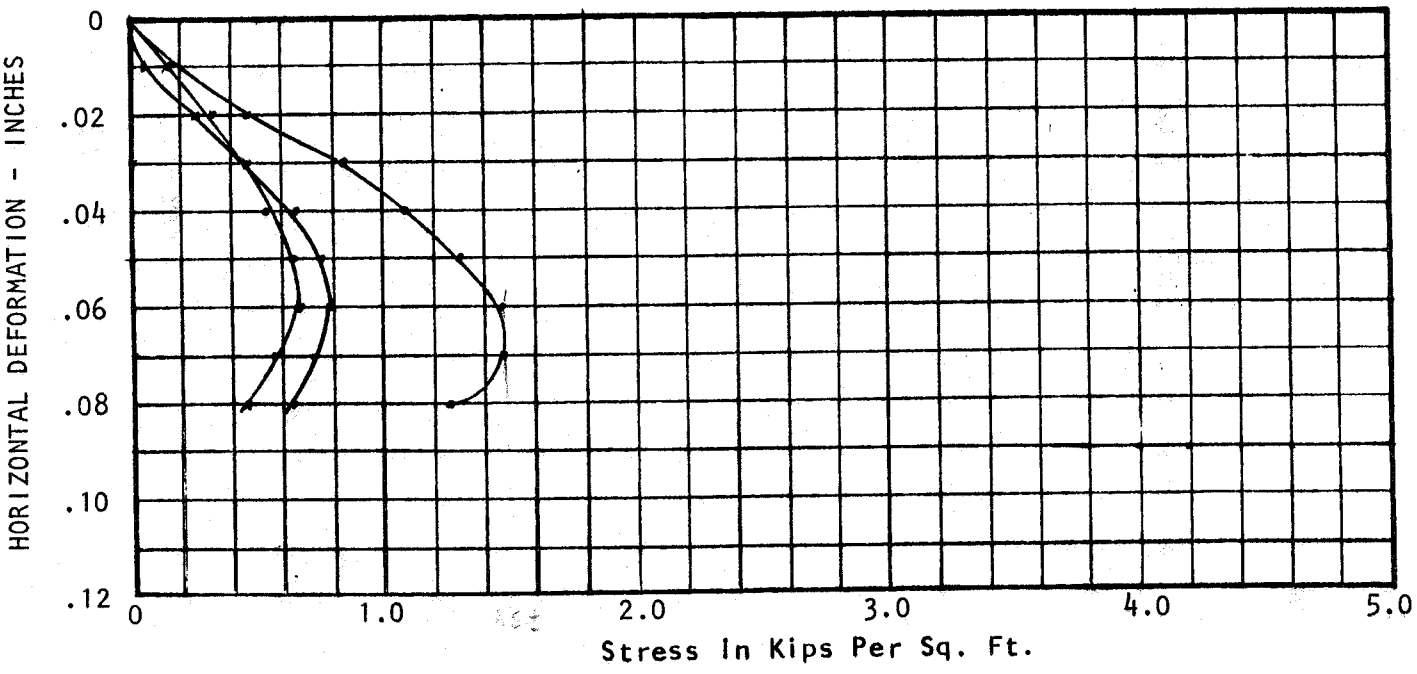
3_ GULF POWER COMPANY
ATTN: MR. RALPH CZEPLUCH

PENSACOLA TESTING LABORATORIES, INC.

By John D Sims

PENSACOLA TESTING LABORATORIES, INC. REPORT NO: 55827





STRESS-STRAIN CURVES

"Cohesion", C 0

Angle of Shear Resistance, Ø 38°

Unit Weight, γ 94.4 =90% ASTM D-698

Water Content, W 14.2

Void Ratio, e

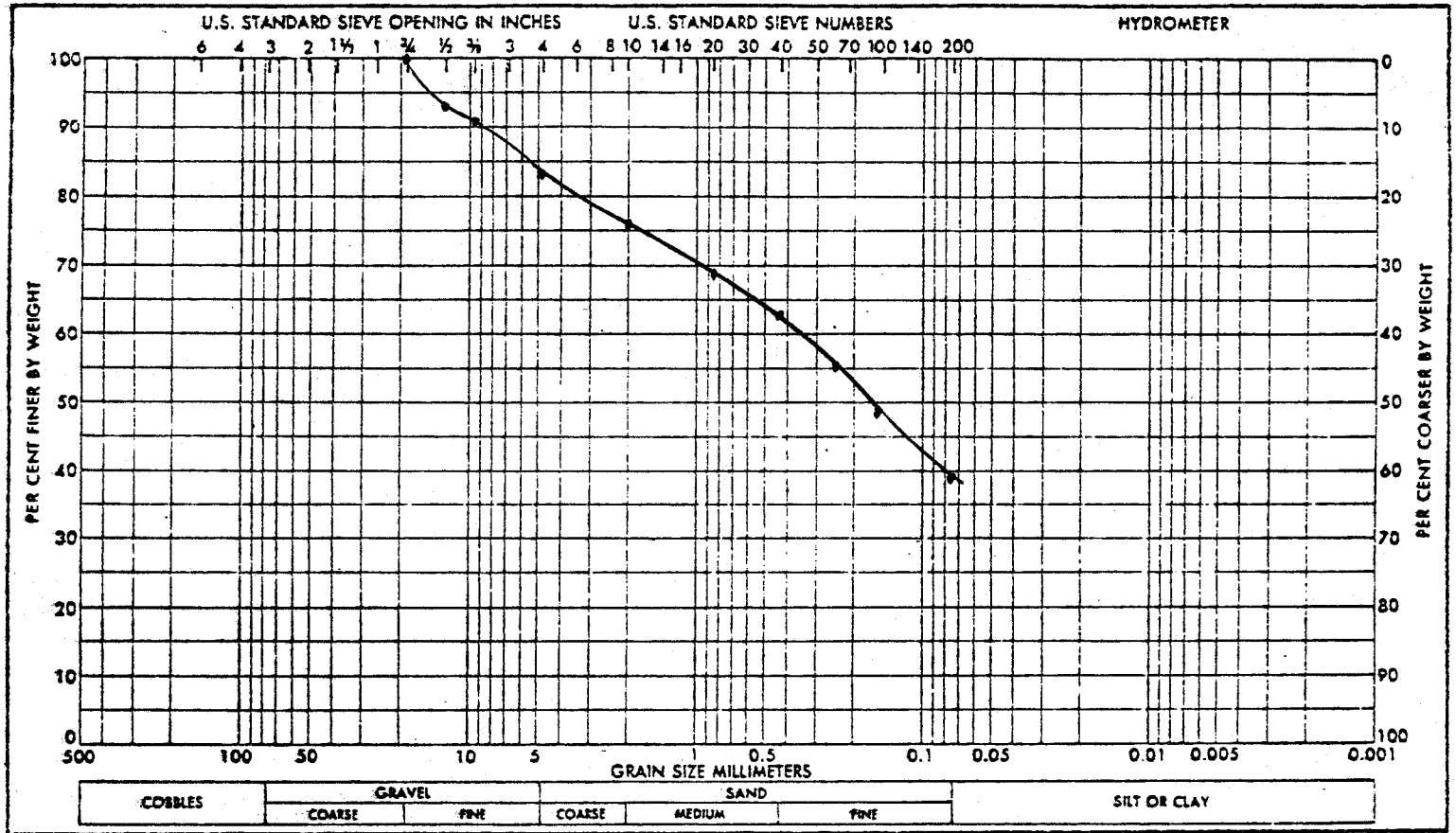
NOTE: SAMPLE SIEVED OVER #4 BEFORE TEST

DIRECT SHEAR TEST

GULF POWER COMPANY
SMITH PLANT - 50% BOTTOM ASH
50% SAND (BY LOOSE VOL

PENSACOLA TESTING LABORATORIES, INC.

REPORT NO. 55827



SAMPLE NO.	ELEV OF DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
		SMITH PLANT				
		50% FLY ASH				
		50% BOTTOM ASH				

GRADATION CURVES

PROJECT: GULF POWER CO. SMITH PLANT

AREA:

BORING NO.:

DATE: 3/2/81

SIEVE SIZES:	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200
% PASSING:	100	93.5	90.8	83.5	75.1	68.5	62.9	55.2	48.5	38.8

PENSACOLA TESTING LABORATORIES, INC

CHEMICAL ANALYSES – INSPECTIONS – TESTS

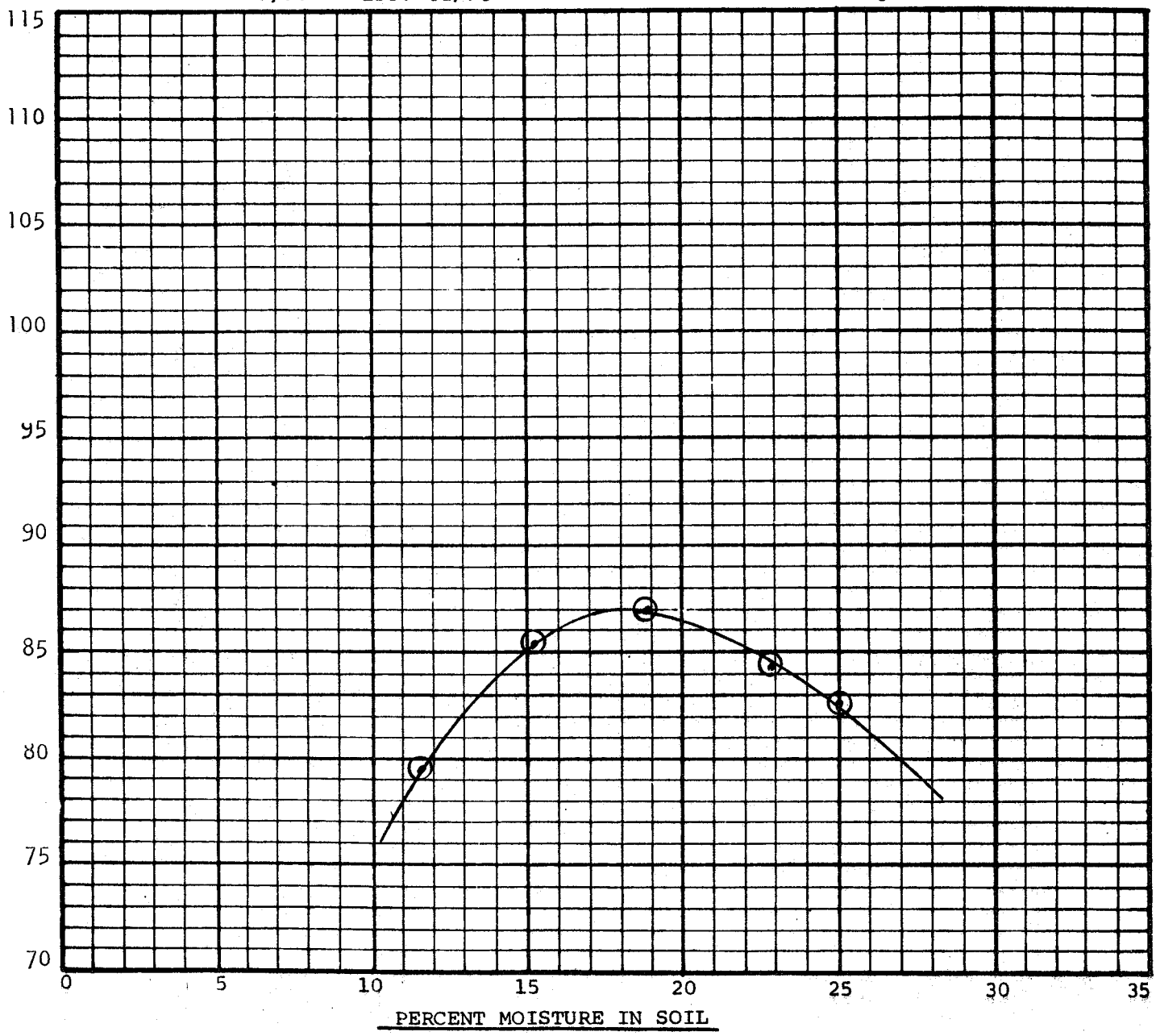
PROCTOR

OFFICE AND LABORATORIES
217 East Brent Lane
Pensacola, Florida 32503
Phone: 477-5100

PROJECT SMITH PLANT
FOR GULF POWER CO., P.O.BOX 1151,PENSACOLA, FL
SAMPLE IDENTIFICATION 50% FLY ASH, 50% BOTTOM ASH
APPLICABLE SPECIFICATION ASTM D-698
SAMPLED AND TESTED BY CLIENT AND J. SIMS

REPORT NO. 55827 bh
DATE 3/2/81
ORDER NO.
DATE 2/23/81

MAXIMUM DENSITY 87.0 Lbs. Cu/Ft. OPTIMUM MOISTURE 18.0 %

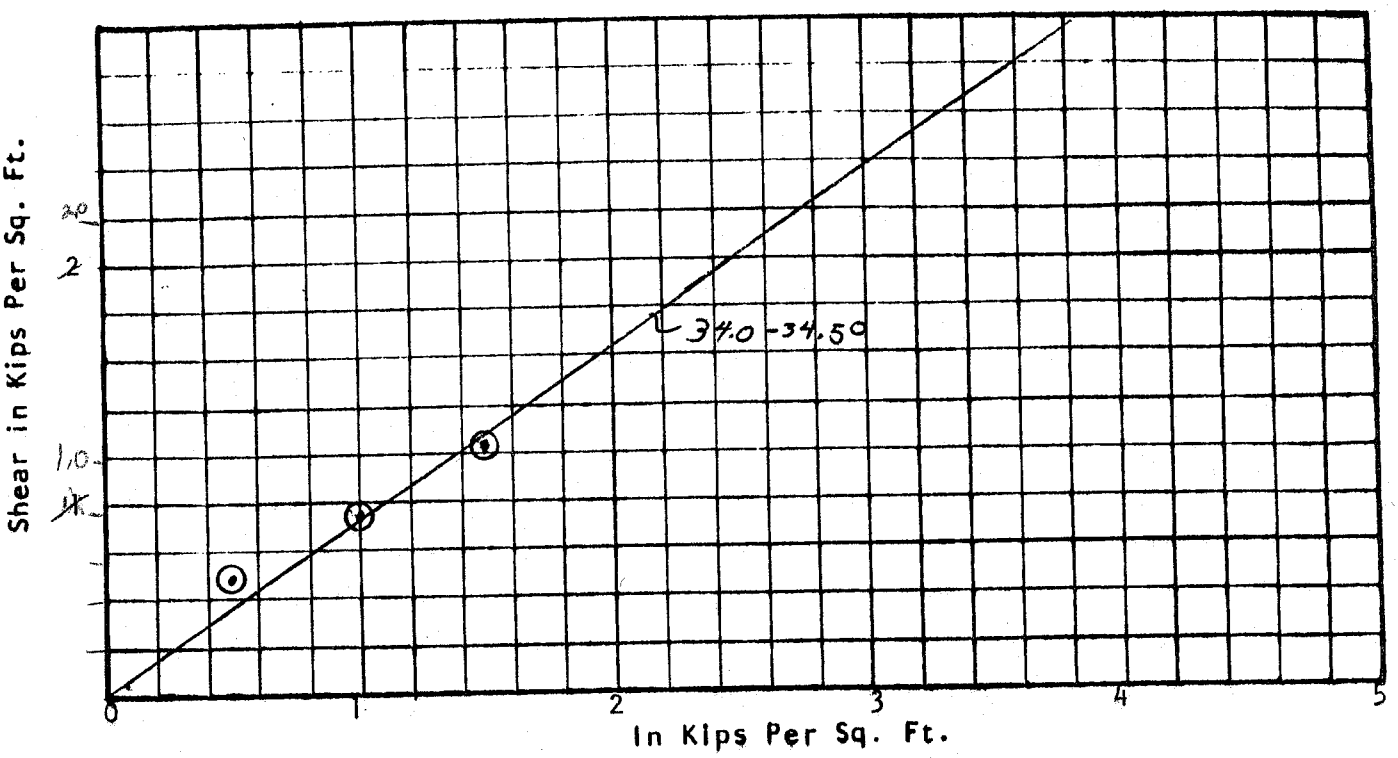


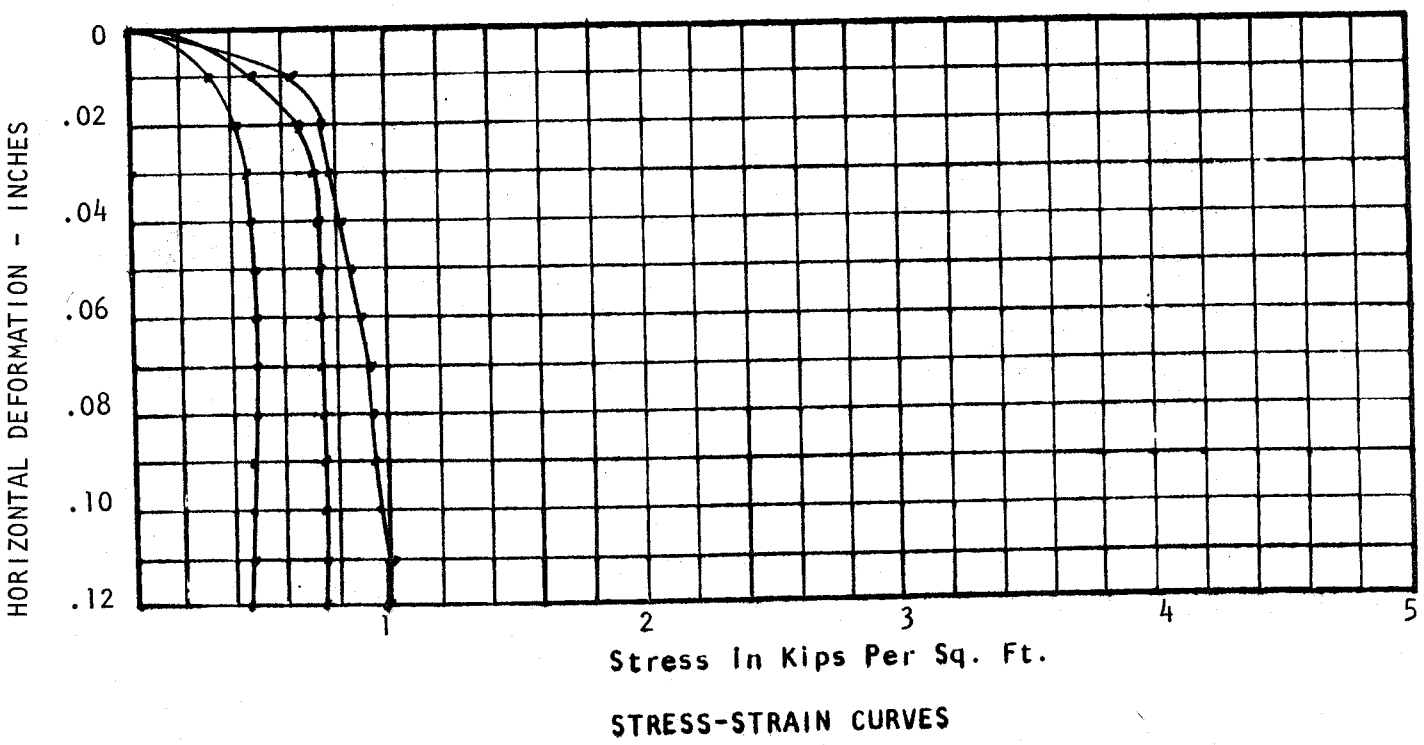
Reports to: Gulf Power Co.

PENSACOLA TESTING LABORATORIES, INC.

By John D Sims

PENSACOLA TESTING LABORATORIES, INC. REPORT NO: 55827





STRESS-STRAIN CURVES

"Cohesion", C 0

Angle of Shear Resistance, Ø 35°

DRY Unit Weight, γ 78.3 (90% ASTM D-698)

Water Content, W 18.0

Void Ratio, e

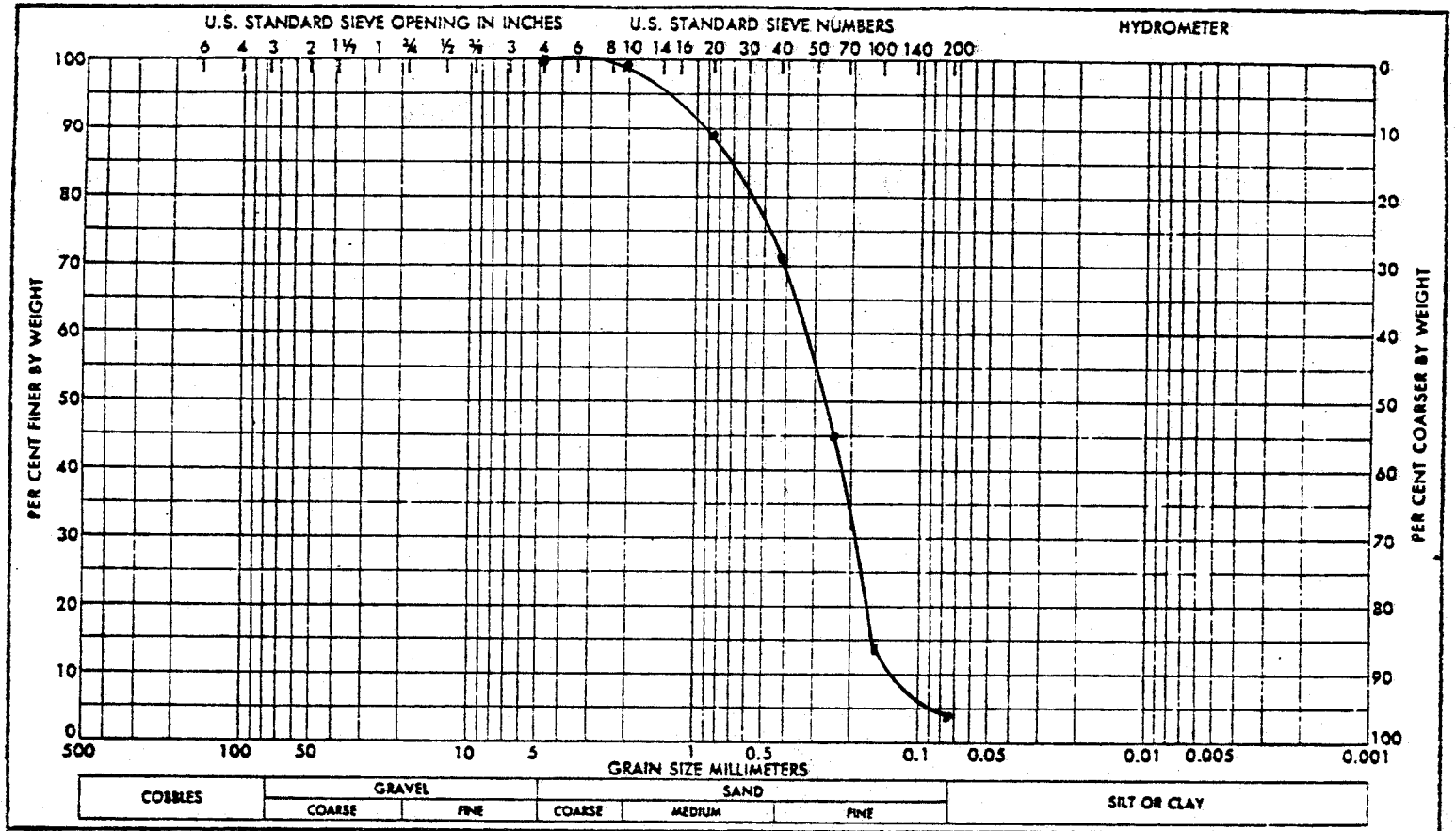
NOTE: SAMPLE SIEVED OVER #4 BEFORE TESTING

DIRECT SHEAR TEST

GULF POWER CO. - SMITH PLANT
50% FLY ASH, 50% BOTTOM ASH
(BY LOOSE VOLUME)

PENSACOLA TESTING LABORATORIES, INC.

REPORT NO: 55827



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
		SMITH PLANT SAND				

GRADATION CURVES

PROJECT GULF POWER COMPANY
SMITH PLANT, PANAMA CITY,
AREA
BORING NO.
DATE March 2, 1981

SIEVE SIZES:	# 4,	#10,	#20,	#40,	#60,	#100,	#200
% PASSING:	100	99.2	88.9	70.9	44.6	14.3	4.2

ATTACHMENT E

Plant Scholz Ash Pond Dikes by: Ben Gallagher

Pseudostatic Coefficent from USGS PSHA

Based on Bray and Travasarou (2007)

Height of Slope	35	ft	a=	3.858236
Shear Wave Velocity of Slide Ma	1000	ft/sec	b=	4.504542
Period of Slide Mass (Ts)	0.14	sec	**Pseudostatic Analysis**	
1.5 Ts	0.21	sec	**Kh**	**0.074 g**
Earthquake Magnitude	6.05	M		
Spectral Acc	0.161	g		
Allowable Crest Dispacement	2	in		
episilon	1.3398	(2% exceedance)		

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number:
TV-SZ-FPC33667-001

Project/Plant: Plant Scholz CCB Facility	**Unit(s):** Common	**Discipline/Area:** Geotechnical
Title/Subject: Analysis of Liquefaction Potential for Ash Pond		
Purpose/Objective: Evaluate the potential for dike and foundation soils to liquefy under earthquake shaking		
System or Equipment Tag Numbers: NA	**Originator:** Benjamin J. Gallagher, P.E.	

Contents

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	BJG/09-07-12	JCP/09-07-12	JCP/09-07-12

Notes:

Purpose of Calculation

Plant Scholz is a coal-fired steam plant and produces ash as a byproduct of combustion. The ash sluiced to the ash pond where it is allowed to settle. Ash is periodically dredged from the pond and stacked in a landfill located within the perimeter of the ash pond. The pond is subdivided into a series of five water management cells by non-structural interior berms.

The ash pond is enclosed by dikes on the north, east and south sides. On the west side, natural topography forms the boundary of facility. The dikes are made of compacted earth bearing on native soils. The purpose of this calculation is to evaluate the potential for liquefaction of the dikes and foundation soils to occur during earthquake shaking.

Summary of Conclusions

The USGS online map of Quaternary Fault and Fold Database indicates the nearest mapped faults are the Gulf-margin normal faults, located nearly 200km west of Plant Scholz. The USGS report indicates there is little evident of Quaternary slip on these faults, and states that is it not clear that slip on these faults would occur seismically. They have a “strikingly low historical seismicity.”

Based on factors of safety of at least 1.8, liquefaction does not appear to be a significant threat during the CEUS scenario earthquake. This earthquake source comprises 75 percent of the overall mapped hazard at the ash pond.

During the Charleston scenario earthquake, some of softer soils within and immediately below the dikes exhibited factors of safety between 0.9 and 1.4. This suggests some pockets may liquefy and others portions of the dike may lose strength due to earthquake-induced pore pressure buildup. It should be recognized that the Charleston earthquake source is currently modeled in the USGS probabilistic hazard analysis as a time-independent event, where the probability of occurring tomorrow is the same as the probability of occurring on a day 300 years from now. Paleoseismic evidence suggests that major earthquakes in the Charleston Source zone may recur on the order of every 500 years. The last major event happened in 1886, or about 126 years ago. Although a time-dependant model for the Charleston hazard is not available at present, we believe there is very low likelyhood of a Charleston scenario earthquake occurring during the remaining life of the plant.

To evaluate the impact of earthquake-induced liquefaction and strength loss in the soft soils, it would be necessary to perform seismic deformation analysis on the dike and foundation. This would be an extensive undertaking including significant additional field and laboratory testing, and engineering analysis. Given the low risk, such an extensive study is unwarranted at this time.

Methodology

Liquefaction potential was assessed using procedures outlined in the 2004 paper by Idriss and Boulanger titled, "Semi-Empirical Procedures for Evaluating *Liquefaction Potential During Earthquakes*".

The SPT test data collected in 2009 and 2010 was used to evaluate liquefaction potential. Supplemental information regarding SPT correction factors was obtained from the 2001 paper by Youd and Idriss " Liquefaction Resistance of Soils: Summary Report From The 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils" and ASTM D 6066-04. The reported factor of safety is the ratio of the cyclic resistance ratio (CRR) to the cyclic stress ratio (CSR).

The deaggregation of the published 2008 PSHA data for the site indicates the 75% of the seismic hazard for Plant Scholz is derived from the Central and Eastern US random faulting source (CEUS), and about 18% percent of the hazard is attributed to the distant Charleston Source Zone. Two scenarios were evaluated for potential liquefaction, the average magnitude and acceleration from the CEUS random source and the distant M7.4 Charleston event.

Criteria and Assumptions

Based on the SPT data, the subsurface conditions at the ash pond are considered consistent with Site Class E, Soft Soils.

The deaggregation of the USGS PSHA data (2% chance of exceedance over 50 years) for the Plant Crist indicated an average earthquake of M5.8 at 100km for the CUES source and a M7.4 at 435km for Charleston. The corresponding site-modified zero period accelerations (PGA) are 0.060g (CEUS) and 0.048g (Charleston). A topographic amplification factor of 1.42 was applied to the site-modified PGA values to determine the accelerations at the crest of the dikes.

SPT testing was generally performed at 5-foot increments throughout the borings. The liquefaction potential was analyzed at each SPT test and the results are summarized on the attached table. Liquefaction potential is evaluated as the CRR divided by CSR. Values of less than 1.1 are considered at risk of liquefaction during a design earthquake event, values between 1.1 and 1.4 are considered to have the potential for some pore-pressure induced strength loss, and values greater than 1.4 are considered not likely to liquefy.

Design Inputs/References

1. Southern Company SPT Test Borings SDB-3, SDB-4 and SDB-5 (2009)
2. Southern Company SPT Test Borings EDB-2, EDB-6 and NDB-4 (2010)
3. USGS Probabilistic Earthquake Hazard Data Interactive Deaggregation (2008 data; 2% exceedance over 50 years)

Body of Calculation

Attached

Plant Scholz Ash Pond

Simplified Evaluation of Liquefaction Potential in SPT Test Borings

prepared by Ben Gallagher, 9/7/2012

North and East Dike

	EDB-2			EDB-6			NDB-4		
Depth	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston
5	10	>5	>5	3	4.6	3.0	5	>5	3.8
10	7	>5	3.3	**0**	2.2	1.4	**0**	2.2	1.4
15	4	2.6	1.6	2	2.8	1.7	**0**	2.0	**1.2**
20	2	2.6	1.5	7	4.6	2.7	8	4.6	2.7
25	0	1.9	**1.0**	**0**	1.9	**1.0**	97	>5	>5
30	3	2.8	1.4	**1**	2.2	**1.1**	77	>5	>5
35	5	3.4	1.7	2	2.5	**1.2**	50	>5	>5
40	2	2.6	**1.2**	14	>5	2.8			
45	2	2.2	**0.9**	88	>5	>5			
50	20	>5	>5						
55	50	>5	>5						

Water at 5 feet below top of dike

South Dike

	SDB-3			SDB-4			SDB-5		
Depth	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston
5	21	>5	>5	13	>5	>5	22	>5	>5
10	7	3.7	2.4	3	2.3	1.5	2	2.0	**1.3**
15	2	2.8	1.7	3	3.2	1.9	3	2.2	**1.3**
20	0	1.9	**1.1**	3	2.9	1.7	19	>5	>5
25	0	1.8	**1.0**	1	2.2	**1.2**	1	2.2	**1.2**
30	7	4.1	2.1	2	2.3	**1.2**	43	>5	>5
35	12	>5	3.5	39	>5	>5	100	>5	>5
40	12	>5	3.2	100	>5	>5	100	>5	>5
45	100	>5	>5	100	>5	>5	31	>5	>5
50	100	>5	>5				100	>5	>5

Water at 5 feet below top of dike

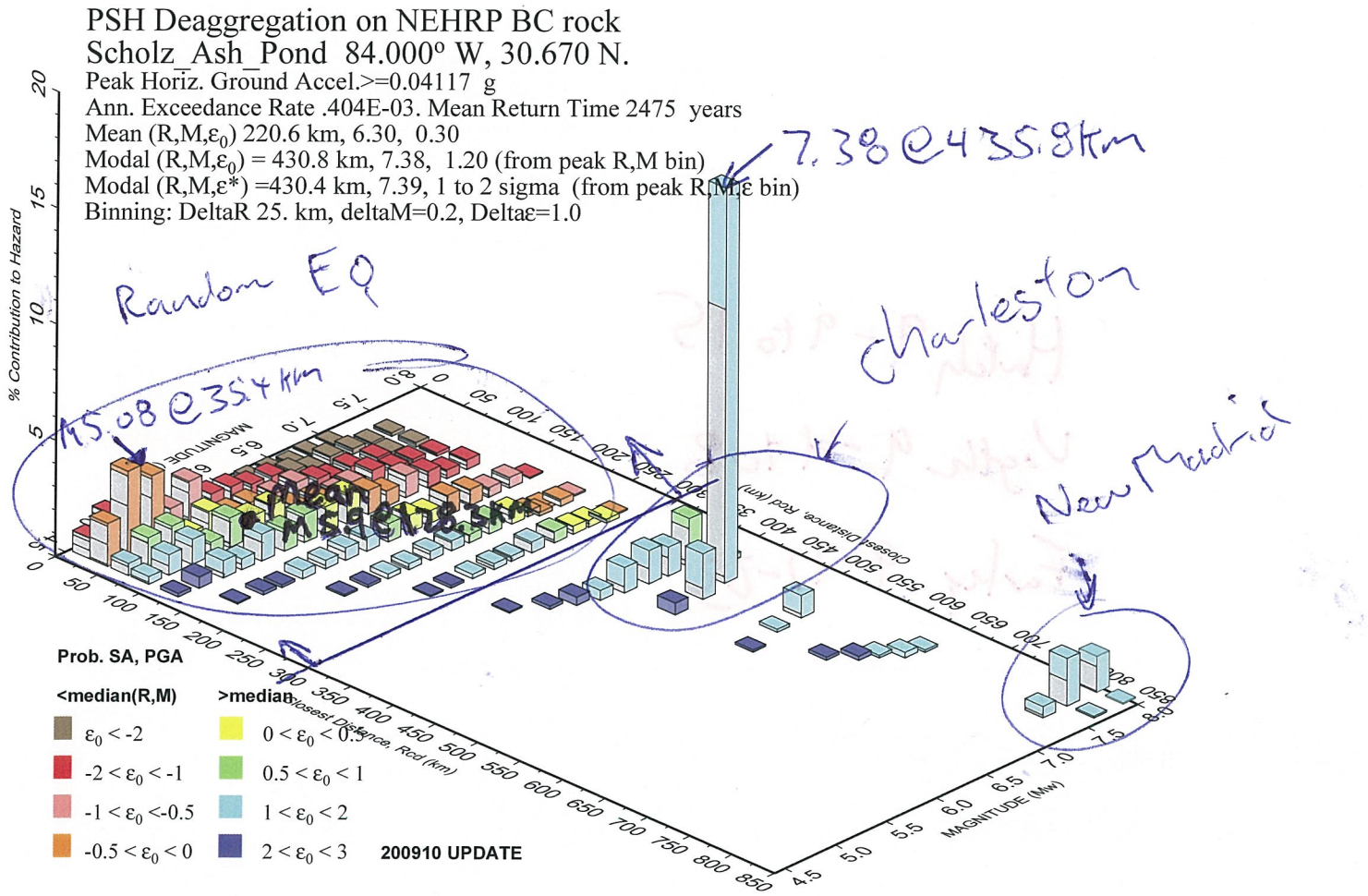
Reported N-values are uncorrected field values

Factor of Safety = Cyclic Resistance Ratio (CRR) divided by the Cyclic Shear Stress Ratio (CSR)

This evaluation was performed following the using the "Simplified" procedures described by Idriss and Boulanger in the paper titled "Semi-emprical procedures for evaluating liquefaction potential during earthquakes " dated January 2004 and the journal article titled "Liquefaction Resistance of Soils: Summary report fromthe 1996 NCEER and 1998 NCEER/NSF Workshops on evaluation of liquefaction resistance of soils" by Youd and Idriss dated April 2001.

The ground motions were selected based on sources identified using the interactive deaggregation of the USGS-published 2008 PSHA data. For comparison, two earthquake sources were considered, the CEUS gridded random source with an average magnitude of 5.93 and distance of 128.3 km and the Charleston source zone with a magnitude of 7.38 and distance of 435.8 km. The respective accelerations (PGA) are 0.024g and 0.019g. Assuming Site Class E, the site-modified zero period accelerations are 0.060g and 0.048g, respectively. A topographic amplification factor of 1.42 was applied to the site-modified PGA values to determine the accelerations at the crest of the dikes.

TV-SZ-FPC33667-001



GMT 2012 Aug 22 14:23:38 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on rock with average vs= 760. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

TV-SZ-FPC33667-001

*** Deaggregation of Seismic Hazard at One Period of Spectral Accel. ***
*** Data from U.S.G.S. National Seismic Hazards Mapping Project, 2008 version ***
PSHA Deaggregation. %contributions. site: Scholz_Ash_Pond long: 84.000 W., lat: 30.670 N.
Vs30(m/s)= 760.0 CEUS atten. model site cl BC(firm) or A(hard).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 2475 yrs. Exceedance PGA =0.04117 g. Weight * Computed_Rate_Ex 0.404E-03
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.00726
#This deaggregation corresponds to Mean Hazard w/all GMPEs

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
14.0	4.60	0.898	0.025	0.147	0.369	0.322	0.034	0.001
34.2	4.60	1.841	0.131	0.777	0.868	0.066	0.000	0.000
59.1	4.61	0.516	0.142	0.374	0.000	0.000	0.000	0.000
83.0	4.61	0.326	0.261	0.065	0.000	0.000	0.000	0.000
117.8	4.61	0.143	0.143	0.000	0.000	0.000	0.000	0.000
14.1	4.79	1.562	0.041	0.242	0.608	0.578	0.091	0.003
34.7	4.80	3.713	0.215	1.285	1.946	0.267	0.000	0.000
59.3	4.80	1.225	0.234	0.942	0.049	0.000	0.000	0.000
83.4	4.81	0.880	0.493	0.386	0.000	0.000	0.000	0.000
119.1	4.81	0.485	0.477	0.007	0.000	0.000	0.000	0.000
163.1	4.82	0.053	0.053	0.000	0.000	0.000	0.000	0.000
14.2	5.03	1.063	0.026	0.156	0.392	0.392	0.093	0.003
35.4	5.03	3.049	0.139	0.830	1.685	0.396	0.000	0.000
59.5	5.03	1.268	0.151	0.848	0.269	0.000	0.000	0.000
83.9	5.04	1.079	0.325	0.754	0.000	0.000	0.000	0.000
120.2	5.04	0.736	0.566	0.170	0.000	0.000	0.000	0.000
166.8	5.04	0.139	0.139	0.000	0.000	0.000	0.000	0.000
14.3	5.21	0.392	0.009	0.056	0.140	0.140	0.044	0.001
35.9	5.21	1.276	0.050	0.297	0.696	0.233	0.000	0.000
59.7	5.21	0.623	0.054	0.323	0.246	0.000	0.000	0.000
84.2	5.21	0.600	0.116	0.478	0.005	0.000	0.000	0.000
120.9	5.21	0.471	0.246	0.225	0.000	0.000	0.000	0.000
168.4	5.21	0.116	0.116	0.000	0.000	0.000	0.000	0.000
14.3	5.39	0.578	0.014	0.081	0.204	0.204	0.073	0.003
36.3	5.39	2.089	0.072	0.430	1.072	0.501	0.013	0.000
59.8	5.40	1.173	0.078	0.468	0.627	0.000	0.000	0.000
84.5	5.40	1.277	0.169	0.931	0.177	0.000	0.000	0.000
121.7	5.40	1.162	0.361	0.801	0.000	0.000	0.000	0.000
169.4	5.41	0.353	0.315	0.039	0.000	0.000	0.000	0.000
217.7	5.41	0.077	0.077	0.000	0.000	0.000	0.000	0.000
14.4	5.61	0.276	0.006	0.038	0.096	0.096	0.037	0.003
36.7	5.61	1.111	0.034	0.203	0.509	0.346	0.019	0.000
60.0	5.61	0.729	0.037	0.220	0.453	0.019	0.000	0.000
84.8	5.62	0.915	0.079	0.474	0.362	0.000	0.000	0.000
122.4	5.62	0.971	0.170	0.751	0.049	0.000	0.000	0.000
170.3	5.62	0.367	0.215	0.151	0.000	0.000	0.000	0.000
219.8	5.62	0.112	0.112	0.000	0.000	0.000	0.000	0.000
14.4	5.80	0.240	0.006	0.033	0.083	0.083	0.033	0.003
36.9	5.80	1.026	0.029	0.175	0.439	0.354	0.029	0.000
60.2	5.80	0.739	0.032	0.190	0.452	0.065	0.000	0.000
85.1	5.81	1.015	0.068	0.409	0.538	0.000	0.000	0.000
123.0	5.81	1.204	0.147	0.816	0.242	0.000	0.000	0.000
170.9	5.81	0.530	0.195	0.335	0.000	0.000	0.000	0.000
220.6	5.81	0.192	0.178	0.014	0.000	0.000	0.000	0.000
270.3	5.82	0.060	0.060	0.000	0.000	0.000	0.000	0.000
13.7	6.01	0.179	0.004	0.025	0.062	0.062	0.025	0.003
36.5	6.01	0.717	0.019	0.113	0.284	0.266	0.035	0.000
64.1	6.01	0.756	0.029	0.173	0.431	0.124	0.000	0.000
88.1	6.00	0.628	0.033	0.196	0.398	0.002	0.000	0.000
123.4	6.01	1.126	0.091	0.541	0.494	0.000	0.000	0.000
171.8	6.01	0.588	0.120	0.452	0.016	0.000	0.000	0.000
221.6	6.01	0.254	0.159	0.095	0.000	0.000	0.000	0.000
271.3	6.02	0.105	0.104	0.000	0.000	0.000	0.000	0.000
339.2	6.02	0.060	0.060	0.000	0.000	0.000	0.000	0.000
13.7	6.21	0.189	0.004	0.026	0.065	0.065	0.026	0.004

36.5	6.21	0.655	0.017	0.099	0.249	0.246	0.045	0.001
65.0	6.21	0.837	0.029	0.172	0.431	0.205	0.000	0.000
89.8	6.21	0.582	0.025	0.152	0.371	0.034	0.000	0.000
123.9	6.21	1.297	0.079	0.475	0.743	0.000	0.000	0.000
172.8	6.22	0.786	0.105	0.555	0.126	0.000	0.000	0.000
222.3	6.22	0.389	0.142	0.247	0.000	0.000	0.000	0.000
271.9	6.22	0.188	0.164	0.025	0.000	0.000	0.000	0.000
358.8	6.26	0.134	0.134	0.000	0.000	0.000	0.000	0.000
13.0	6.42	0.114	0.003	0.015	0.039	0.039	0.015	0.002
36.4	6.42	0.430	0.010	0.063	0.157	0.157	0.042	0.001
65.0	6.42	0.577	0.018	0.105	0.263	0.191	0.001	0.000
89.8	6.42	0.436	0.016	0.094	0.236	0.090	0.000	0.000
124.5	6.42	1.024	0.048	0.284	0.645	0.046	0.000	0.000
173.4	6.42	0.748	0.065	0.386	0.298	0.000	0.000	0.000
222.9	6.42	0.431	0.086	0.337	0.008	0.000	0.000	0.000
272.7	6.43	0.244	0.124	0.120	0.000	0.000	0.000	0.000
369.8	6.43	0.353	0.347	0.007	0.000	0.000	0.000	0.000
17.5	6.58	0.117	0.003	0.016	0.040	0.040	0.016	0.002
38.7	6.60	0.218	0.005	0.031	0.079	0.079	0.023	0.000
60.6	6.59	0.237	0.007	0.039	0.099	0.090	0.003	0.000
85.8	6.59	0.390	0.013	0.075	0.189	0.114	0.000	0.000
125.3	6.59	0.672	0.027	0.162	0.400	0.083	0.000	0.000
173.6	6.59	0.548	0.036	0.218	0.293	0.000	0.000	0.000
223.1	6.60	0.357	0.049	0.262	0.047	0.000	0.000	0.000
272.8	6.60	0.230	0.072	0.158	0.000	0.000	0.000	0.000
377.2	6.60	0.419	0.379	0.041	0.000	0.000	0.000	0.000
13.4	6.78	0.103	0.002	0.014	0.035	0.035	0.014	0.002
37.0	6.78	0.360	0.008	0.051	0.127	0.127	0.044	0.002
60.7	6.78	0.314	0.008	0.050	0.124	0.122	0.010	0.000
85.8	6.78	0.534	0.016	0.095	0.238	0.186	0.000	0.000
125.2	6.78	0.951	0.034	0.201	0.504	0.212	0.000	0.000
174.0	6.79	0.865	0.045	0.271	0.534	0.015	0.000	0.000
223.6	6.79	0.659	0.062	0.372	0.225	0.000	0.000	0.000
273.6	6.79	0.459	0.089	0.362	0.008	0.000	0.000	0.000
382.3	6.79	1.091	0.838	0.254	0.000	0.000	0.000	0.000
442.0	6.80	0.502	0.502	0.000	0.000	0.000	0.000	0.000
537.5	6.77	0.076	0.076	0.000	0.000	0.000	0.000	0.000
13.8	7.00	0.073	0.002	0.010	0.025	0.025	0.010	0.002
36.5	7.00	0.236	0.005	0.033	0.082	0.082	0.031	0.002
64.6	7.01	0.292	0.007	0.045	0.112	0.112	0.017	0.000
88.3	6.99	0.283	0.008	0.046	0.116	0.111	0.001	0.000
125.3	7.00	0.685	0.021	0.126	0.317	0.221	0.000	0.000
174.7	7.00	0.692	0.028	0.170	0.416	0.077	0.000	0.000
224.3	7.00	0.596	0.038	0.230	0.328	0.000	0.000	0.000
274.2	7.01	0.484	0.056	0.325	0.103	0.000	0.000	0.000
385.4	7.01	1.432	0.782	0.649	0.001	0.000	0.000	0.000
438.7	7.10	1.981	1.498	0.483	0.000	0.000	0.000	0.000
526.7	7.10	0.131	0.131	0.000	0.000	0.000	0.000	0.000
592.8	7.04	0.121	0.121	0.000	0.000	0.000	0.000	0.000
36.5	7.19	0.130	0.003	0.018	0.045	0.045	0.018	0.001
60.1	7.18	0.118	0.003	0.017	0.043	0.043	0.011	0.000
85.6	7.18	0.203	0.005	0.032	0.080	0.079	0.007	0.000
125.6	7.19	0.378	0.011	0.065	0.164	0.138	0.001	0.000
175.3	7.19	0.408	0.015	0.088	0.222	0.083	0.000	0.000
224.4	7.16	0.244	0.013	0.079	0.151	0.000	0.000	0.000
225.3	7.23	0.151	0.007	0.042	0.097	0.005	0.000	0.000
274.5	7.19	0.353	0.029	0.175	0.149	0.000	0.000	0.000
386.9	7.19	1.241	0.458	0.758	0.025	0.000	0.000	0.000
612.8	7.19	0.175	0.175	0.000	0.000	0.000	0.000	0.000
36.2	7.39	0.148	0.003	0.020	0.051	0.051	0.020	0.002
65.3	7.38	0.189	0.005	0.027	0.069	0.069	0.019	0.000
89.8	7.39	0.143	0.004	0.022	0.054	0.054	0.009	0.000
125.5	7.38	0.409	0.011	0.066	0.167	0.158	0.005	0.000
175.8	7.39	0.452	0.015	0.088	0.222	0.128	0.000	0.000

224.9	7.32	0.185	0.009	0.051	0.119	0.007	0.000	0.000
225.3	7.44	0.284	0.012	0.069	0.172	0.032	0.000	0.000
274.7	7.34	0.291	0.019	0.113	0.159	0.000	0.000	0.000
275.3	7.47	0.185	0.010	0.062	0.112	0.000	0.000	0.000
387.2	7.39	2.066	0.440	1.422	0.204	0.000	0.000	0.000
430.8	7.38	17.008	5.221	11.511	0.277	0.000	0.000	0.000
522.5	7.37	0.980	0.803	0.177	0.000	0.000	0.000	0.000
622.0	7.32	0.122	0.119	0.004	0.000	0.000	0.000	0.000
637.6	7.44	0.236	0.204	0.032	0.000	0.000	0.000	0.000
799.5	7.45	0.498	0.387	0.111	0.000	0.000	0.000	0.000
175.4	7.59	0.056	0.002	0.010	0.025	0.020	0.000	0.000
225.5	7.59	0.062	0.002	0.013	0.034	0.013	0.000	0.000
275.5	7.59	0.066	0.003	0.019	0.043	0.001	0.000	0.000
398.8	7.54	0.130	0.020	0.087	0.023	0.000	0.000	0.000
400.8	7.63	0.224	0.031	0.148	0.045	0.000	0.000	0.000
642.3	7.60	0.099	0.070	0.029	0.000	0.000	0.000	0.000
798.6	7.70	2.043	0.963	1.080	0.000	0.000	0.000	0.000
830.3	7.70	0.074	0.027	0.047	0.000	0.000	0.000	0.000
798.7	8.00	1.545	0.446	1.042	0.057	0.000	0.000	0.000
830.3	8.00	0.054	0.008	0.046	0.000	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 100.0
Mean src-site R= 220.6 km; M= 6.30; eps0= 0.30. Mean calculated for all sources.
Modal src-site R= 430.8 km; M= 7.38; eps0= 1.20 from peak (R,M) bin
MODE R*= 430.4km; M*= 7.39; EPS.INTERVAL: 1 to 2 sigma % CONTRIB.= 11.511

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
New Madrid SZ no clustering	4.26	799.7	7.79	1.52
CEUS gridded	75.10	128.3	5.93	-0.04
Charleston SC M>7.2; 2 zones	17.99	435.8	7.38	1.23

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
New Madrid FZ, central	2.99	799.9	7.79	1.52	-41.3

#*********End of deaggregation corresponding to Mean Hazard w/all GMPEs *********#

PSHA Deaggregation. %contributions. site: Scholz_Ash_Pond long: 84.000 W., lat: 30.670 N.
Vs30(m/s)= 760.0 CEUS atten. model site cl BC(firm) or A(hard).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 2475 yrs. Exceedance PGA =0.04117 g. Weight * Computed_Rate_Ex 0.791E-04
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.00879
#This deaggregation corresponds to Toro et al. 1997

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
14.2	4.60	0.245	0.025	0.147	0.074	0.000	0.000	0.000
35.0	4.60	0.635	0.131	0.487	0.017	0.000	0.000	0.000
59.5	4.61	0.239	0.142	0.097	0.000	0.000	0.000	0.000
82.7	4.61	0.163	0.161	0.001	0.000	0.000	0.000	0.000
116.9	4.61	0.058	0.058	0.000	0.000	0.000	0.000	0.000
14.2	4.79	0.411	0.041	0.242	0.128	0.000	0.000	0.000
35.3	4.80	1.153	0.215	0.886	0.051	0.000	0.000	0.000
59.6	4.80	0.481	0.234	0.247	0.000	0.000	0.000	0.000
83.0	4.81	0.357	0.326	0.031	0.000	0.000	0.000	0.000
117.9	4.81	0.149	0.149	0.000	0.000	0.000	0.000	0.000
163.3	4.83	0.015	0.015	0.000	0.000	0.000	0.000	0.000
14.3	5.03	0.275	0.026	0.156	0.092	0.000	0.000	0.000
35.9	5.03	0.918	0.139	0.700	0.079	0.000	0.000	0.000
59.8	5.03	0.467	0.151	0.316	0.000	0.000	0.000	0.000
83.4	5.03	0.407	0.291	0.116	0.000	0.000	0.000	0.000
119.2	5.04	0.213	0.212	0.000	0.000	0.000	0.000	0.000
167.2	5.04	0.040	0.040	0.000	0.000	0.000	0.000	0.000
14.3	5.21	0.100	0.009	0.056	0.035	0.000	0.000	0.000
36.3	5.21	0.374	0.050	0.278	0.047	0.000	0.000	0.000
59.9	5.21	0.218	0.054	0.164	0.000	0.000	0.000	0.000

Exhibit 37

South Dike Where Trees Removed 25 Feet Down From the Crest (View to Southwest)

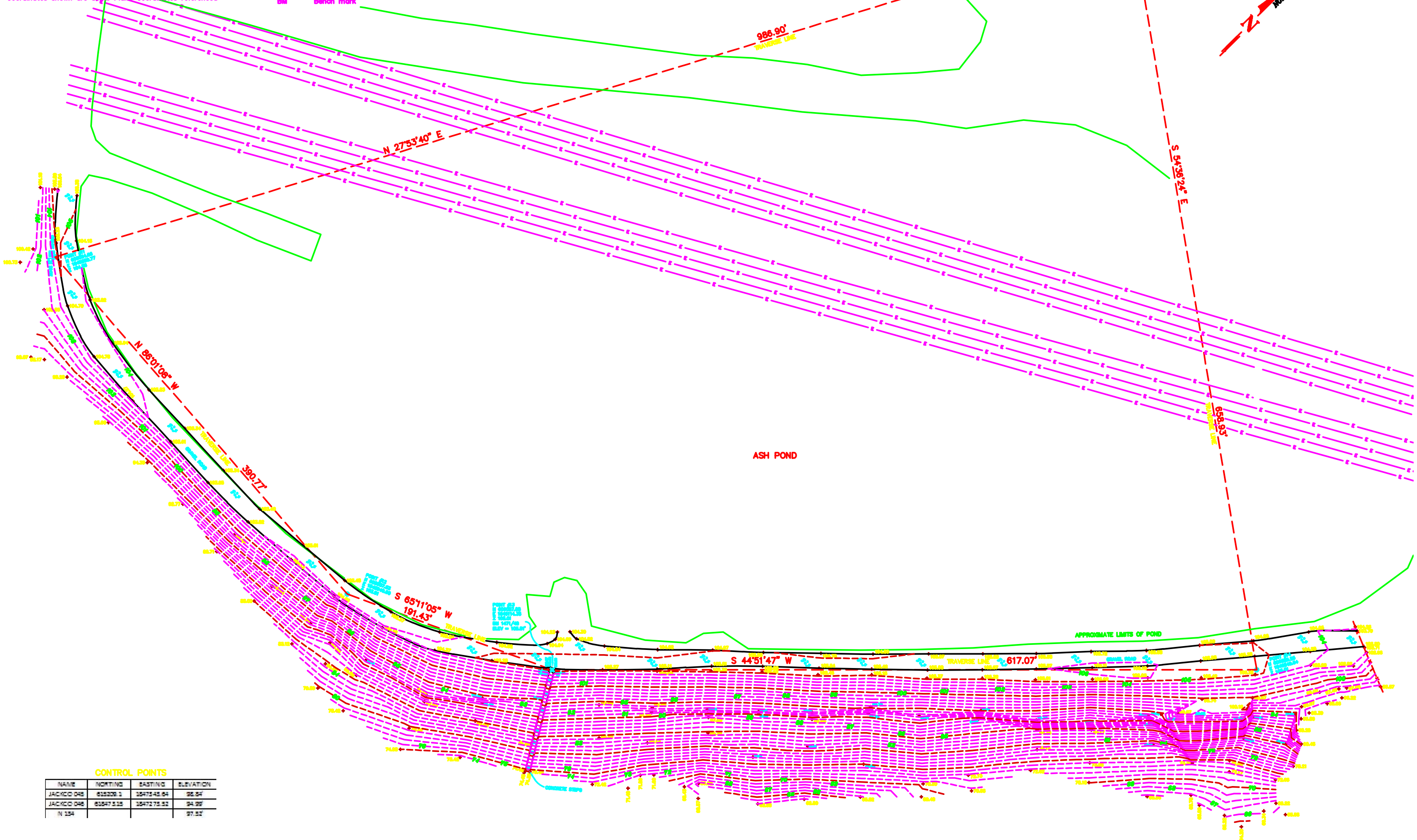
South Dike Where Trees Removed 25 Feet Down From the Crest (View to Northeast)

SURVEYOR'S NOTES:
1. The underground utilities shown have been located from field survey information and existing drawings. The surveyor has not physically located the underground utilities. The surveyor does not certify that the underground utilities shown comprise all such utilities or that they are the exact size, material, or location as indicated.
2. This survey does not reflect or determine ownership.
3. This survey is subject to any facts that may be disclosed by a full and accurate title search.
4. This survey is subject to setbacks, easements, and restrictions of record.
5. To assure the contractor is on the same vertical and horizontal datum as this survey, it is strongly recommended that vertical checks be made between two benchmarks and that horizontal checks be made between three control points or property corners.
6. Footings and foundations below natural ground not located.

7. Coordinates shown are State Plane Coordinates referenced to N.A.D. 83 datum, 2011 adjustment, Florida North Zone and expressed in U.S. survey feet.

BENCHMARKS:
1120/50 -A cotton gin spike in the west side of a 12" pine tree located in the southeast corner of the project site, 135'+/- east and 100'+/- south of the top of bank.
Elevation = 108.32'
1120/68 -An "X" in the southwest corner of a concrete retaining wall located at the old caustic tank for the Scholz Power Plant; also being 35'+/- southwest of the diesel tank.
Elevation = 103.95'
1471/48 -An "X" in the center of a concrete landing located at the north end of concrete steps located along the southern dike for most southeast ash pond for Scholz Power Plant.
Elevation= 105.01'

LEGEND:
BM Bench mark
ELEV Elevation
INV Invert
CPP Corrugated plastic pipe
1/2" Capped iron rod set #7073
"X" cut in concrete
Electric line
Spot elevation
Contour line
Chain link fence
Northing
Easting
Elevation
Monitor well



CONTROL POINTS

NAME	NORTING	EASTING	ELEVATION
JACKCO 045	615309.1	1547543.64	95.84'
JACKCO 046	615475.35	1547275.52	94.99'
N 134			97.52'

Measurements made in accordance with United States Standards.

Bearing Reference NORTH BASED ON STATE PLANE COORDINATE SYSTEM (GRID NORTH)
Ordered By SUSAN HARRIS
Elevation Reference NAVD 88
Encroachments
Source of Information PUBLIC RECORDS; INFORMATION FURNISHED BY CLIENT

TOPOGRAPHIC SURVEY OF A PORTION OF ASH PONDS, SCHOLZ PLANT, SNEADS, FLORIDA, SECTION 12, T-3-N, R-07-W

PITTMAN, GLAZE AND ASSOCIATES, INC.
LAND SURVEYORS
5700 N. DAVIS HIGHWAY, SUITE 3
PENSACOLA, FL 32503
Phone (850) 434-5686 Fax (850) 434-5681

I hereby certify that this survey was made under my responsible charge and meets the Minimum Technical Standards as set forth by the Florida Board of Professional Surveyors & Mappers in Chapter 5J-17.050, 5J-17.051 and 5J-17.052, pursuant to Section 472.027 Florida Statutes.

David D. Glaze PSM #5605
Walter J. Glaze PSM #6190

SHEET 1 OF 1

LB No. 7073

NOT VALID UNLESS IMPRINTED WITH EMBOSSED SEAL AND SIGN BY SURVEYOR

Scale 1" = 40'
File No. C-5848
Job No. 35298-12
Date of Plat 12-31-12
Date of Survey 12-28-12
FB 1471 PG 47-53
FB PG
FB PG
Drawn by PMJ